Starbird, Virginia
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Art ability: its analysis and measurement for purposes of prognosis.

BOSTON UNIVERSITY

SCHOOL OF EDUCATION

THESIS

ART ABILITY, - ITS ANALYSIS AND MEASUREMENT FOR PURPOSES OF PROGNOSIS

Submitted by

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(B.S. in Ed., Massachusetts School of Art, 1929)

In partial fulfillment of requirements for the degree of Master of Education

1934

First reader - Jesse B. Davis, Professor of Education

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Introduction

As a glance at the title will reveal, this thesis is attempting to deal with the seemingly illusive and much misunderstood topic - art ability - in such a way as to bring it into bounds, that it may be analyzed into its apparent constituent parts and perhaps measured. It is well to state here, that by art ability is meant, general fundamental ability as differentiated from such special abilities as color, design, mechanical, plastic and architectural talents, and judgment, appreciation and technic. These latter elements seem to have been more generally and successfully recognized and measured, but simple, fundamental, non-specialized ability still challenges the best efforts of the worker of a more or less scientific trend of mind in the field of art.

The problem of this thesis, stated very simply, is to answer these three questions: (1) can art ability be analyzed? (2) can it be measured? (3) how?

To answer the first two questions requires an investigation into the literature of the field including direct examination of the tests and measures set up by workers in art education for measuring art ability.

To answer the third question, I shall try to justify my criticism of the present art tests by setting up one of my own. I suspect that before I have completed this task

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I shall be a great deal more charitable and respectful of those tests already in existence which I am about to attack.

There is one more pertinent question which might rightfully be asked and which it is earnestly hoped the findings of this thesis may answer, namely: can success in art be predicted by means of an ability test? If the first three questions are answered successfully, it is probable that this last may also be answered with some degree of assurance.

I

Analysis of Characteristics Related to Ability in Art

In examining the writings and investigations of those eminent in the field of art and education, it is interesting to note that the approach to the analysis of art ability has been largely through a study of the gifted, as contrasted with such subjects as spelling, reading and arithmetic where the approach has been through studies of the particularly deficient. Why this is so we do not know, exactly, except that the presence of art ability is more evident and noticeable than lack of such ability while lack of ability in spelling, arithmetic and reading is more evident in the classroom than is its presence.

In looking over the field, little seems to have been done on the psychology of art ability, though work along this line is slowly getting under way. More definite work has been accomplished in the field of music psychology by Seashore.

What are the native powers of the artist which differentiate him from other individuals? To answer this question it was decided best to list as many of the characteristics as one could discern, from personal observation and contact with art students and teachers, then armed with

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such a list, to investigate the studies of authors and workers in the field of art education.

It was found that much of the material and findings in the analysis of general art ability duplicated one another rather than supplementing or contradicting one another. Thus, the following tables we've selected and accepted as an analysis of art ability as they seemed to include practically all the elements suggested by other investigators, including that of the writer.

The first table, by Manuel, shows the results of a study of persons especially talented. Manuel contends that the stated characteristics, each an independent or partially independent variable, seem closely related to ability in drawing.[1]

(1) "The ability mentally to note visual form, and[2] by certain lines and areas, to reproduce it or significant features of it.
(2) Ability to observe.
(3) Ability to select from a complex visual situation the most representative and the most beautiful aspects.
(4) Memory for visual form.
(5) Ability mentally to manipulate visual forms.
(6) Ability to control hand movements in accordance with visual percept or image.

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1. L. S. Hollingsworth, Special Talents and Defects, p. 143
2. ibid p. 145

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(7) Ability to invent, to bring together into new artistic combinations the elements of different visual experiences.
(8) Ability to judge the beautiful in line, form, color, and composition.
(9) Ability to discriminate differences in color.
(10) Ability to discriminate in visual magnitude.
(11) Acuity of vision.
(12) Interest in the act and products of drawing.
(13) General intelligence."

The following table by Meumann shows the result of a study of persons lacking in art ability:[1]

(1) "The will to analyze and to notice forms and colors has not been stimulated.
(2) The intention to analyze may be aroused, and yet the individual may find the analysis too difficult. This is a matter of innate talent.
(3) The memory of that to be represented may be deficient. It may be incomplete or vague in form or in color. The memory of spatial relations may be inadequate. This, too is a matter of innate talent.
(4) There may be lack of ability to hold the image during the act of drawing. This capacity is innate.
(5) The memory image and the perceptual image may not be coordinated with the movements in drawing. This capacity is innate.
(6) The sight of the drawing in its imperfection as compared with the memory may disturb the image.
(7) The drawer may lack schemata on which to found his drawing.
(8) There may be failure to comprehend how one may project space in three dimensions upon a plane.
(9) Manual skill may fail.
(10) There may be no artistic sense.
(11) Inability to draw may arise from a combination of various of these deficiencies."

Manuel's analysis is used in Chapter II for examination of tests and in Chapter III for construction of an art test.

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Art ability is partially, at least, involved in certain types of motor adjustment, such as visual reactions, rapidity of movement, precision of movement, and responses to visual stimuli.[1] It seems to be bound up rather closely with visual imagery and memory and involves fine judgments of spatial relations, perspective, design and color.

Now that we have a fair analysis of the characteristics related to art ability, I shall attempt to point out to what extent such abilities are being measured by contemporary tests.

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II

A Survey and Criticism of Tests Intended to Measure Art Ability

In carefully looking over the field of art tests and measures, three types predominate, (1) art ability tests, (2) art appreciation tests, and (3) art achievement tests, though no one of the tests measures one of these phases of art exclusively. In fact, it is practically impossible to differentiate between any test given to measure ability and achievement. These two factors are so intimately related that tests attempting to distinguish ability from achievement test both, for achievement is the common factor in test construction and is the only visible means of determining degrees of ability.

Art appreciation and judgment, however, seem to be less related to ability and achievement and can be isolated and tested comparatively successfully.

However, the successful measurement of each of these phases of art depends greatly on the type of test used, its validity, reliability, subjectivity and objectivity, and upon the person administering the test and the favorable or unfavorable environmental conditions attending its administration.

Now let us look at the outstanding tests for art measurement, and see what they offer and if their claims

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Now let us look at the outstanding tests for art measurement, and see what they offer and if their claims

are justified.

Though my aim, primarily, is to find tests measuring only fundamental art ability, such I have not found. Some do test ability in part, some ability and achievement and some appreciation, wholly or in part. Therefore, the outstanding tests in each of these phases is presented that the reader may see for himself and judge their value. The writer's judgment is just one point of view and by no means infallible or beyond criticism. First of all, let us look at the tests which claim to test general fundamental ability primarily.

Thorndike published his "Scale for the Measurement of Quality of Handwriting" in 1910, and in 1911 he constructed a scale to apply to childrens' drawings.[1] The subjects used were a house, a man and a snow-ball fight. They were given to children from 8 to 15 years of age. The drawings were rated on a 10 point scale, the basis of the judgments being technic. This was a scale for general merit and therefore lacked specificity. It also had a number of limitations, the most outstanding one being the fact that the drawings were rated by comparison with one scale comprising a variety of subjects, but there were no comparisons with a standard of its own kind. This makes it difficult to adequately separate talent from training.

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The purpose of this arrangement and test was for: -

(1) Determining growth in ability from grade to grade.

(2) Determining standards or norms of ability for each grade.

(3) Determining limitations of scale in actual use.

(4) Determining what administrative problems could be brought to light which might be desirable for supervising authorities to know.

The tables of distribution and curves show that the average child develops more ability in drawing before entering school at the age of 6 or 7 years than he does in the entire 8 years of his elementary school course. This is shown in tables and data in the article and the fact that drawings in grade one were made within four weeks of the beginning of the term. This is completely in accord with the studies of childrens' drawings by Barnes, Lukens,

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Burk, and Gotze, who also report a plateau of non-development from the ages of 9 or 10 on to adolescence (grades 5 and 6).[1] This, it would seem, is of considerable significance to the person attempting to diagnose ability and predicting success.

Child's scale has succeeded in achieving the purposes set out, but with one major drawback i.e. it has mistaken growth in ability for growth in achievement or school success. The reason for this is the limitations of the test itself, not the aims or purposes. Further experimentation on this test would probably bring to light some of the latent possibilities.

Kline and Cary in 1922 overcame some of the limitations of the Child test.[2] This is another achievement test for primary, grammar, and high school grades. It is a test of four subjects, - a house, a rabbit, a boy running, and a brush drawing of a tree. The drawings are made by memory and without coaching. Samples of each of these subjects is given for comparison and scoring, each subject having fourteen variations of quality on a sample sheet. A score is given to each sample and the student or teacher holds the drawing up to that most nearly like the sample, reads the description beneath the sample, and if it is just like the

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1. H. G. Child - "The Measuring of Drawing Ability", journal Educational Psychology, 1915, p. 407
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This test, again, seems to measure achievement. It does not measure appreciation, judgment, or aptitude. I should say it was an instrument for measuring teaching success more than any other factor.

The Lewerenz art test[1] is supposed to test for general art ability, whether it does or not is a question. Here, also, the achievement phase seems predominant. The one poor feature of this test is the section dealing with subject matter vocabulary. In the writer's opinion, there is no question but what subject matter vocabulary has its place in an art test of a special type, but not in one dealing primarily with fundamental abilities.

The Lewerenz test is given in three parts, one period being given for each part.

Part I[2]

"1. Recognition of proportion.
2. Originality of line drawing.

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Part II

3. Observation of light and shade.
4. Knowledge of subject matter vocabulary.
5. Visual memory of proportion.

Part III

6. Analysis of problems in cylindrical perspective.
7. Analysis of problems in parallel perspective.
8. Analysis of problems in angular perspective.
9. Recognition of color."

On reviewing this outline, it appears to be quite a comprehensive test, which is quite true; again, it is the limitations of the test itself that make it fall short of its expectations. However, Lewerenz constructs a profile from the results of this test and makes some very definite conclusions, diagnoses, and recommendations. For instance, he goes so far as to say that a child who did not show much imagination in filling out the dots, would probably be a copyist, while a child whose imagination is humorous and shows no color sense would be a cartoonist. Obviously, such predictions on the basis of one test are unjustified.

Bird in 1930, developed a new test to determine drawing ability. The following were his subject matter requirements:[1]

"1. The object should be a common one in the environment so that all pupils have had as nearly as possible, an equal opportunity to become familiar with it.

2. Its essential characteristics should present as little variation as possible.

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3. It should be simple enough for the younger children yet sufficiently complicated to tax the abilities of an adult.

4. It should be interesting.

5. It should be an object which, as far as possible reduces the effects of previous practice experience in that object."

With the above requirements in mind he selected as the first subject, a man picking up a dollar. This was a familiar subject and activity. Five minutes were given for the test. Proportion was the major principle, then action. He found that proportion and action could be achieved in spite of the violation of the principles of technique. Also, technique could be present minus proportion, organization, and action. This is quite a significant fact, known to be true by some art teachers, but never really tested or measured.

Next he chose a cat which was to be drawn (1) running after a ball (2) from a model (3) from memory (of model). This procedure is reliable, proved to be valid, and is well controlled. It tests ability to a greater degree than any of the others.[1] More of this type test would bring favourable results as regards diagnosing art ability, but it would be better given as an individual test rather than a group test.

Now we shall look at some tests designed to test art

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appreciation, primarily, and achievement incidentally.

Christensen and Karwoski devised three methods for testing art appreciation.[1] The first and most satisfactory method requires a comparison of two pictures, one good and one bad.[2] Following that, are five specific reasons why it is better. These are worded for elementary as well as for older students. The second method is the judging of a single picture as good or not so good, by checking one of five given reasons. The third method requires the selection of the best from four samples of similar subjects, taken from paintings, sculpture, architecture, design, and industrial art.

Those taking the test were divided into four groups: untrained, general art students, advanced art students, and art instructors. The results of this test show a decided improvement in training, indicating that the test measures the amount of conventional training which has been received. The test controls guessing and there was shown a high correlation between correct choice of picture and correct choice of reason, making the measurement of appreciation more valid.

Whitford, of the University of Chicago, has constructed a test for art appreciation and drawing.[3]

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1. E. Christensen & T. Karwoski, "A Test for Art Appreciation", Uni. No. Dakots, Art Psy. Bulletin, (1925)
2. M. H. Bird, "A Study in Aesthetics", Harvard monograph in Education, pp. 39 & 40.
3. W. C. Whitford, "An Introduction to Art Educ.", pp.236-71.

on, relation, originality, and achievement individually.

Curiosity and interest determine three criteria for testing art appreciation.[1] The first and most satisfactory method requires a comparison of two pictures, one good and one bad.[2] Following that, are five questions reason why it is better. These are graded for elementary to rank as for older students. The second method is the judging of a single picture as good or not so good, by choosing one of five given reasons. The third method requires the selection of the best from four series of similar subjects, rate from paintings, sculpture, architecture, design, and industrial art.

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2. H. Lim, "A study in aesthetics", Survey monograph in education, pp. 74 & 40.

The first part, designed to measure appreciation, is based on the principles of formal design. These principles include repetition, alternation, balance, symmetry, contrast, and proportion. Three forms are given in each of the fourteen problems, one of the three is supposed to be the correct standard, and this the student is supposed to indicate. The test requires about 15 minutes. The drawing test was given to measure accomplishment or achievement.

It is interesting to note that Whitford, nowhere claims to be testing ability.

The McAdory test is primarily one for measuring art appreciation.[1] It is in the multiple response form and requires an ordered choice, according to the relative merit of the four separate illustrations in each of the sixty problems. The pictures are chosen from everyday life, furniture, clothing, architecture, and painting. An attempt was made to make them impersonal so that prejudice would not condition the judgments. The principles underlying the selection were shape and line arrangements (formal design) light and shade and color. McAdory believes that the test may serve as a measurement to distinguish degrees of artistic merit. The main advantages of the test are:

1. Its use of color, for this affects one's judgment greatly.

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1. M. McAdory, "The Construction and Validation of an Art Test", N.Y. Bureau of Public., Teachers' Coll, Col. Univ.(1929)

The first part, designed to measure appreciation, is based on the principles of formal design. These principles include repetition, alternation, balance, symmetry, contrast, and proportion. Three forms are given in each of the fourteen problems, one of the three is supposed to be the correct standard, and this the student is supposed to indicate. The test requires about 15 minutes. The drawing test was given to measure accomplishment or achievement.

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The McAdory test is primarily one for measuring art appreciation.[1] It is in the multiple response form and requires an ordered choice, according to the relative merit of the four separate illustrations in each of the sixty problems. The pictures are chosen from everyday life, furniture, clothing, architecture, and painting. An attempt was made to make them impersonal so that prejudice would not condition the judgments. The principles underlying the selection were shape and line arrangements (formal design) light and shade and color. McAdory believes that the test may serve as a measurement to distinguish degrees of artistic merit. The main advantages of the test are:

1. Its use of color, for this affects one's judgment greatly.

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1. M. McAdory, "The Construction and Validation of an Art Test", N.Y. Bureau of Public., Teachers' Coll. Col. Univ.(1929)

2. The ordered choice of the illustrations, rather than one choice. According to the author's statistics, this gives a much higher reliability.

3. The attempt to allow for psychical distance so that prejudices will not condition judgments.

This test seems to carry out its original purpose quite well. Also, it is more objective and contains a wider range of illustrations and is perhaps more reliable for that very reason.

The Meier-Seashore Art Judgment Test seems to be the best known among the recent tests.[1] It is quite different from other art tests and, according to Bird, is far in advance over many other tests.

Meier's assumption is that there are certain working principles which appear in all good art, namely: harmony, rhythm, and balance. To test these, an art work was copied exactly, the other was slightly altered so as to destroy the harmony, rhythm or balance. Such alterations as the following were made:[2]

"1. Presence or absence of some significant feature.
2. Position of the critical object.
3. Suitability of background.
4. Distribution of detail.
5. Distribution of light.
6. Location of horizon.
7. Quality of line.
8. Use of angles vs curves in the design of a costume.
9. Alteration of perspective."

---

1. Meier-Seashore, "Art Judgment Test", Bear. of Ed., Univ. of Iowa, (1930)
2. M. H. Bird, op. cit., p.45

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2. W. H. Bird, op. cit., p.45

One hundred and twenty-five of these double illustrations were made and given to students.

One of the advantages of such a test is that in every case the artist's work has been taken as the standard, thus eliminating difficulty in standardizing what is good in pictures. However, some of the alterations have changed the subject or thought of ten of the pictures, thus making not a question of which is the better, but which is preferred. Thirteen have no particular choice; in five, either can be justified, and in seven, the altered picture is better than the original.[1]

However, the McAdory & Seashore tests seem to be most helpful in this phase of measurement of appreciation.

It is easy to gather from all this that the matter of testing for art abilities is comparatively recent, as is true of most testing proceedures, also, that there is still much to be done to take it out of the chance and experimental stage. However, it is only from a study of this material that we can gather information and statistics and in so doing perhaps we can also gather an incentive to continue with the work and build upon it.

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1. M. H. Bird, op. cit. p 45

III

A Closer Analysis of Problem

From a study of the previously reviewed tests it seems there is room for improvement in tests intended to measure fundamental art ability. It is also obvious that ability and achievement are difficult to separate for purposes of testing. However, realizing this, let us take it as a challenge and see if there is any way at all in which we might improve or remedy the situation.

First of all, we must keep clearly in mind the list of stated characteristics given by Manuel, which seem to be related to ability in drawing.[1] In looking over the list carefully, we find that more than half (8 out of 13) of these characteristics deal with mental rather than motor qualities. This undoubtedly will be a surprise to those who are unfamiliar with artistic personality and art training. To be sure some of these mental characteristics may be conditioned by motor abilities, or disabilities, but to simplify the problem we shall assume we are dealing with normal persons of normal mental and motor qualifications.

We find such characteristics as: (1) ability mentally to note visual form (2) ability to select from complex visual form (3) memory for visual form (4) ability mentally to manipulate (5) ability to invent (6) ability to judge and to

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discriminate. etc.

Closely allied with these characteristics are those dealing with qualifications of vision and motor control. Last of all is listed intelligence (literally, not in evaluation).

From the foregoing, it would seem fair to assume, then, that true ability in arts is characterized by a special type mind or mental functioning, which in turn is intimately related with physical powers of vision and muscular control. How really simple this seems to be, yet it is all important to the solving or aiding of our problem of improving art ability tests which really detect the conditions we have found to exist.

Keeping this in mind, let us look again at Bird's art ability test, page 11 , part two, where he uses a cat for a subject three times, once from memory, once from a model and once again from memory (of model). I selected this test because I believe it more nearly tests art ability, as described above than any other. Why? Because it tests first a mental quality - visual memory of form - a major characteristic of art ability, then motor powers of vision and observation, the second outstanding characteristic of art ability, and third, it tests both these qualities plus giving the tester a definite opportunity to check on rate of learning. Needless to say, throughout all this, the power of motor control and manipulation manifests itself.

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Obviously this can be called an ability test, not an appreciation test. The factor of achievement can be reduced by wise selection of subject matter used for testing, not using material which has been used at all in a similar manner in school previously. Naturally, if this were done, practice effect would greatly alter this type of test.

It has been noted from art teachers of experience, that this type of sequence drawing, as it is called, is very valuable in helping students to achieve a broader vision by using their minds and reducing technique to a minimum. This type of drawing is widely used and advocated by Woodbury and Perkins in their own school and their teaching in the Mass. School of Art in Boston.[1] In fact, their course is better termed a course in mental training, than a straight art course.

Obviously, all the characteristics of art ability cannot be tested efficiently or effectively in this manner, for instance, those dealing with vision, observation, interest, judgment etc. Primarily. For these, other means must be devised and it is here that we are going to run into the difficulty of avoiding tests of achievement.

The best remedy or precaution for this difficulty now, it seems, and for the success of predictions which might be ventured from such tests, is to build and give them to young children, before entering the first grade if possible, but not later than grade one. Then if desired or requested, give

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them again in grades seven, eight and nine, for purposes of vocational or educational guidance.

As was mentioned earlier, most children by the time they have reached grade one, have learned more, artistically speaking, than they will learn during the next eight years at school. Then from grades five and six to grade twelve (period of adolescence) there appears to be a plateau of learning, during which time little progress is made in art.[1] This may be due to poor motivation or uninteresting work, which should be remedied, but it seems to be quite generally the case at present.

If a first grade youngster, then, comes to school with more artistic ability than he will develop in the next eight years of school, is this not a good time to give him an ability test? Either he will have developed many of the characteristic qualities of art ability at that time, or else he will not, and is very likely not to develop much, as the art courses are taught at present, in the next few years. However, always keep in mind that the fundamental characteristic of art ability is a quality of mind and mind functioning. Thus a child will probably not develop beyond what he comes to grade one with. However, it is very possible for him to develop his powers of observation, muscular control and coordination, yet obviously, there are limitations here also, beyond which he cannot go.

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1. See summary of Child's Test on pages 7-8

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Another obstacle to be dealt with in testing art ability is the fact that there are so many different kinds of art expression or drawing that predictions on too general a test will not be safe or justifiable. Therefore, our sampling must include a wide range of subjects and conditions and sufficient numbers of each to be valid and reliable and warrant predictions or guidance on their findings.

Keeping this in mind, all the suggestions and conditions in the foregoing pages, the writer shall attempt to build a test for general art ability, alone, suitable to pupils 11-16 years, in Junior High School.

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IV

A Test for General Art Ability for Junior High School [1]

Part I

Test no.		Time
1.	Make a side view drawing of a pigeon from memory.	4 min.
2.	Look at the picture of a girl in costume, as given you, for two minutes. Turn the picture over and make a drawing of the same picture from memory, as carefully as you can.[2]	10 min.
3.	Make a picture showing your impression of an amusement park or beach, like Revere, Nantasket or Coney Island, so that whoever looks at your drawing will know where you are, and what you are doing.	12 min.

1. To be given in two parts, each part taking one period of 45 minutes, with at least one period elapsing between each part.
2. Picture on following page.

IV

A Test for General Art Ability for Junior High School [1]

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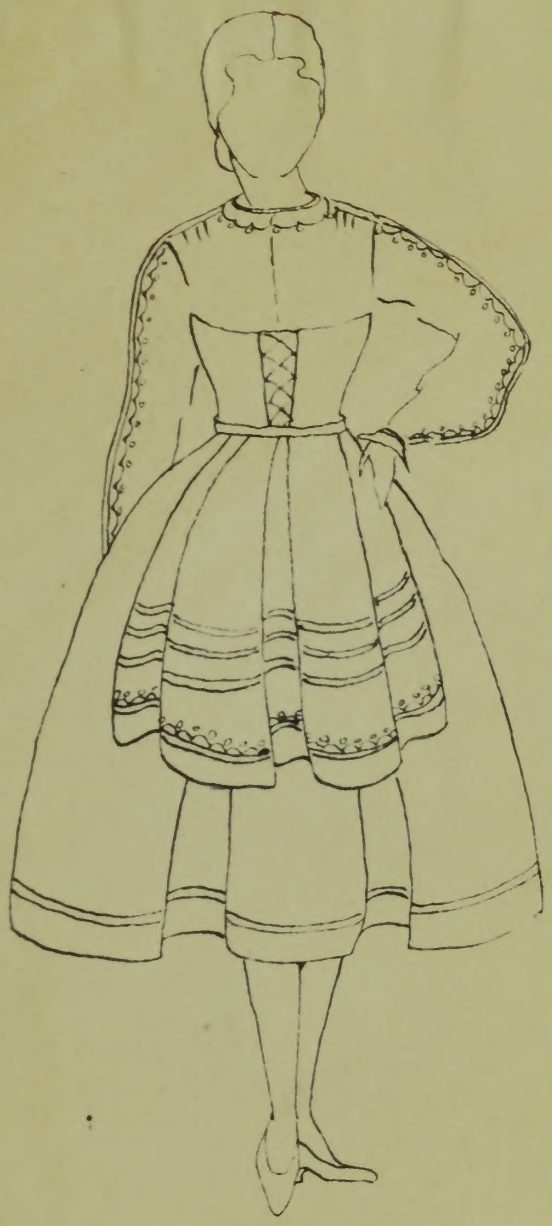
1. To be given in two parts, each part taking one period of 45 minutes, with at least one period elapsing between each part.
2. Picture on following page.



Test no.		Time
4.	Draw a picture of a boy paddling a canoe.	7 min.
5.	Make a side view drawing of a girl sitting at a table, eating.	8 min.
6.	With scissors only, cut an egg shape or oval pattern, from memory.	2 min.

Test No.

Time

4. Draw a picture of a boy paddling a canoe. 7 min.

---

5. Make a side view drawing of a girl sitting at a table, eating. 8 min.

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6. With scissors only, cut an egg shape or oval pattern, from memory. 2 min.

A Test for General Art Ability for Junior High School

(Continued)

Part II

Test no.		Time
7.	With scissors only, cut from folded edge of paper the vase form which you have looked at for two minutes.	3 min.
8.	Make a picture containing - a house, flowers, a flag, three trees. You may add anything else to these four elements you wish to complete your picture.	15 min.
9.	Using only the shapes given you, arrange them so as to make a pleasing and beautiful design or pattern, and draw around them.	7 min.
10.	Starting at the upper left corner of given diagram, at number 1, name color of line, writing name of color against the corresponding number in the column below. Then follow thru, starting at the top, until you come to the end of the line at the bottom	

A Test for General Art Ability

for Junior High School

(Continued)

Part II

Test no.		Time
7.	With scissors only, cut from folded edge of paper the vase form which you have looked at for two minutes.	3 min.
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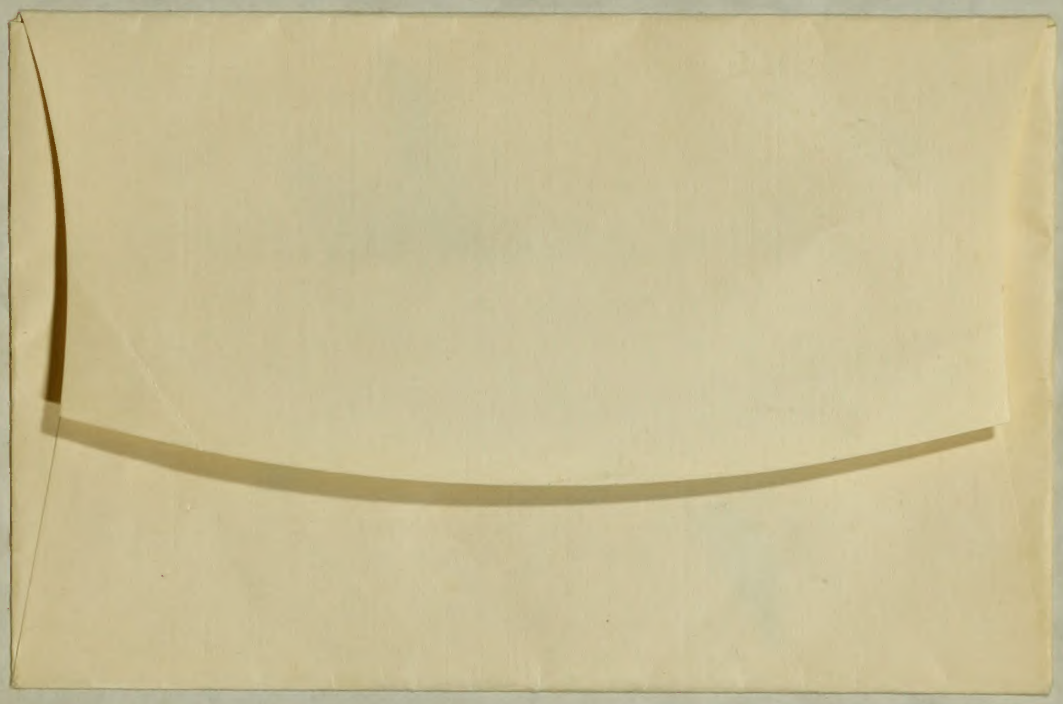

Shapes for use in Test 9.

Test no.		Time.
	and put number found at end of line beside the name of its color in column below.[1]	3 min.
11.	Keeping given picture in front of you, copy it as well as you can.	15 min.

1. Diagram on following page.

Test No. Time.

and put number found at end of line
beside the name of its color in col-
umn below.[1] 3 min.

II. Keeping given picture in front of you,
copy it as well as you can. 15 min.

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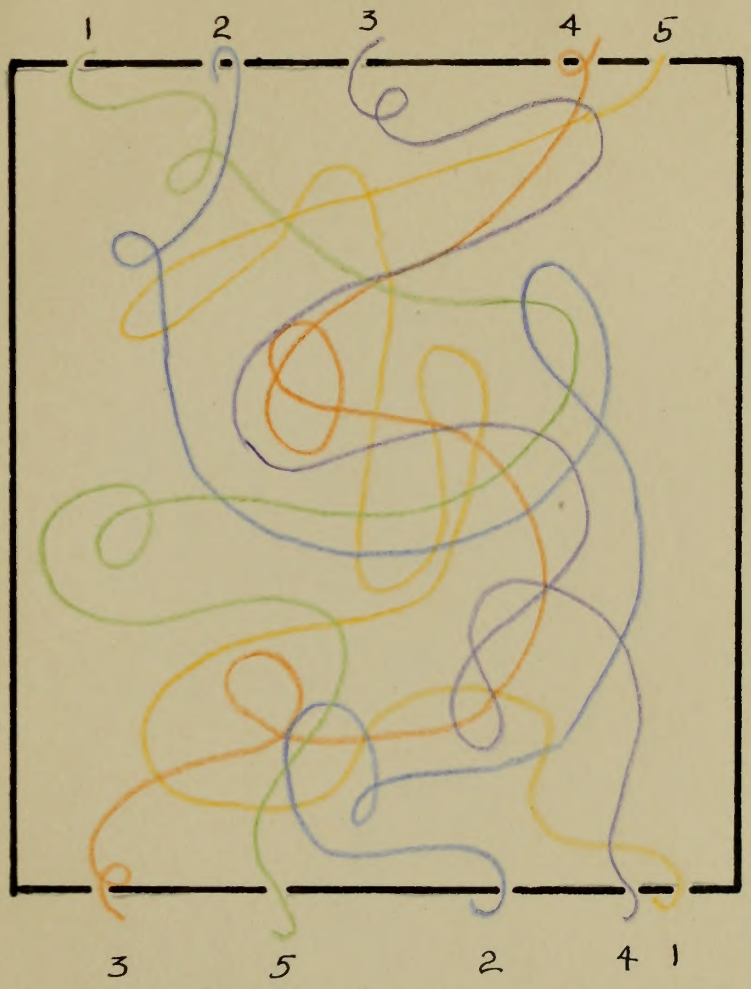
1. Diagram on following page.



1-
2-
3-
4-
5-

Key For Scoring of Test Results

Part I

Test no. 1 Score

Hold the drawing of a pigeon next to the samples shown on the following four pages. Find the sample which resembles the drawing at hand in the most respects and record the score found in the lower right corner.

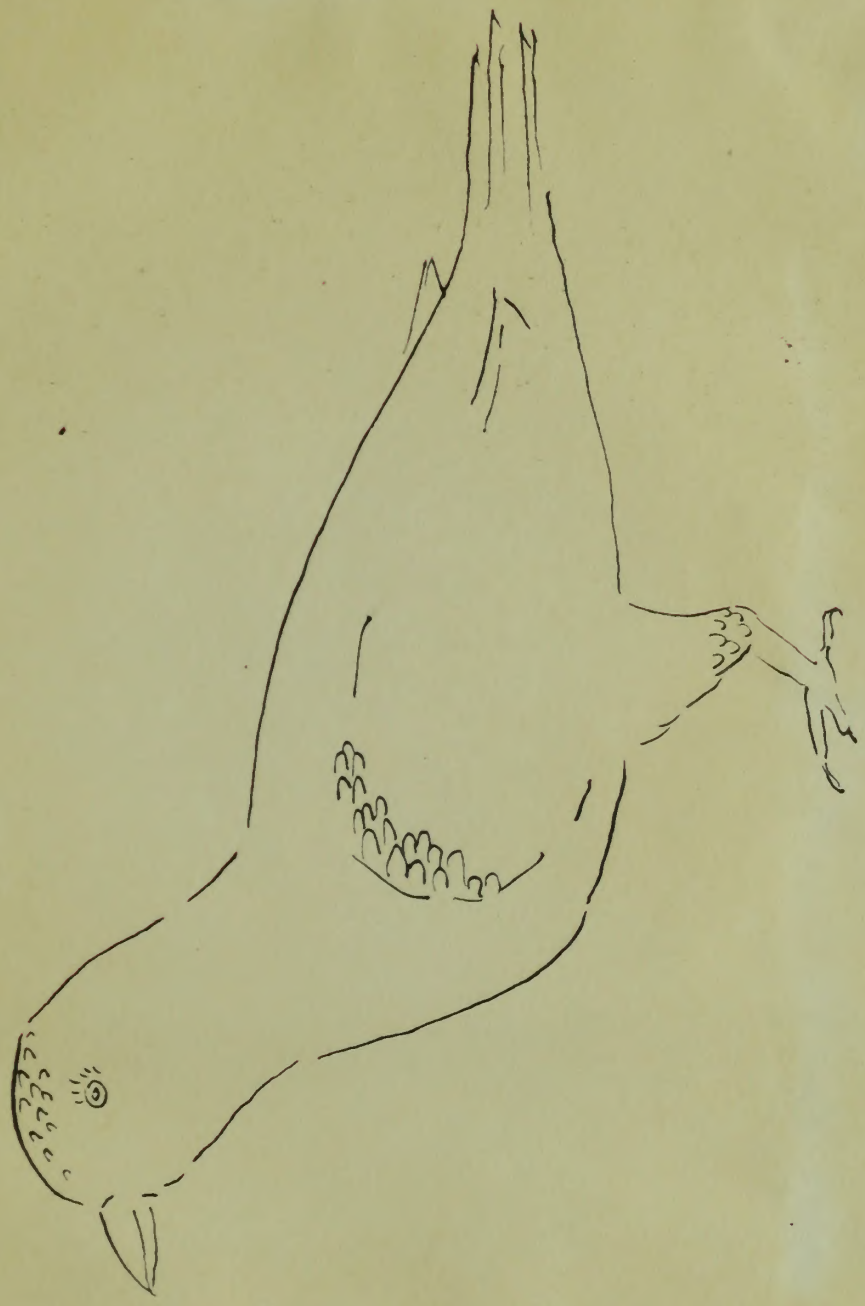
Key for Scoring of Test

Results

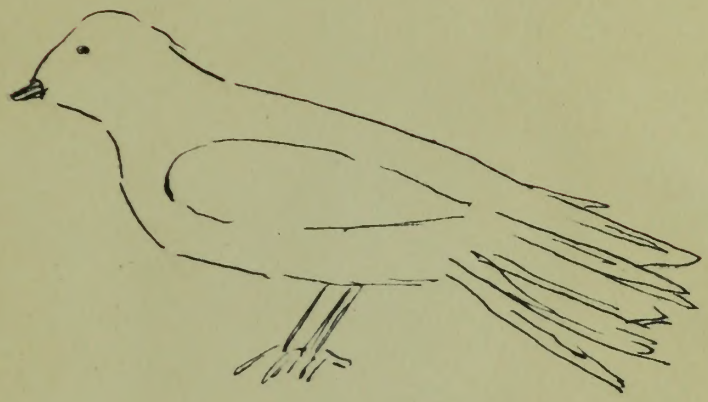
Part I

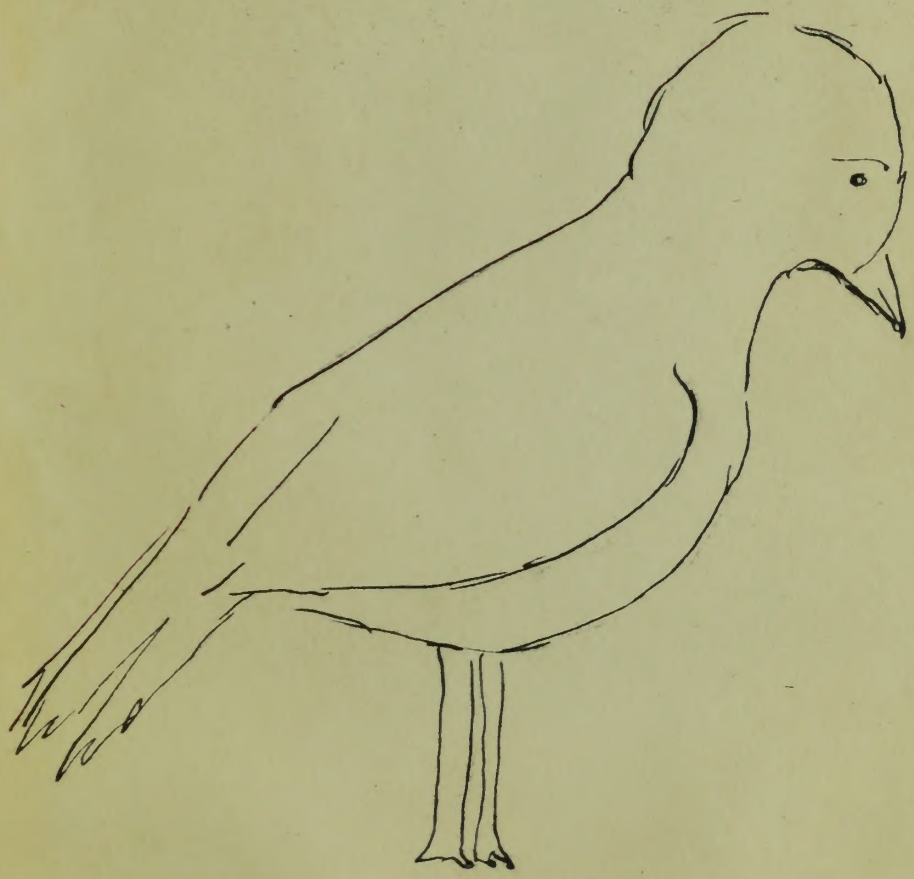
Test No. 1 Score

Hold the drawing of a pigeon next to the samples shown on the following four pages. Find the sample which resembles the drawing at hand in the most respects and record the score found in the lower right corner.



101





50

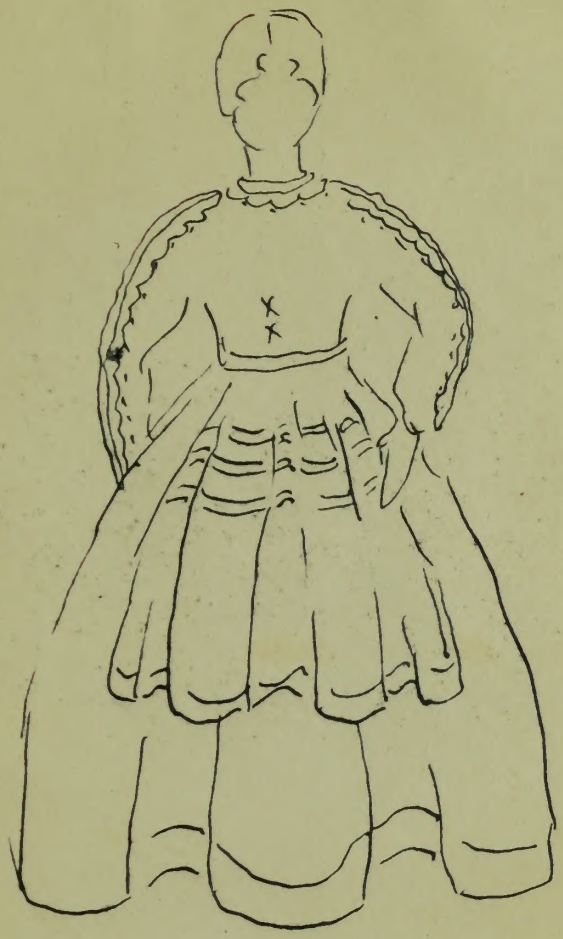
25

Test no. 2 Score

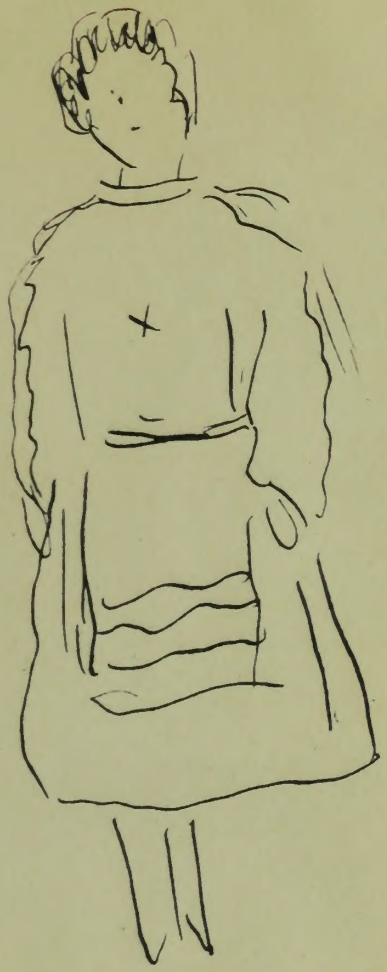
Hold the drawing of a girl in costume next to the samples shown on the following four pages. Find the sample which resembles the drawing at hand in the most respects and record the score found beneath it.

Test no. 2 Score

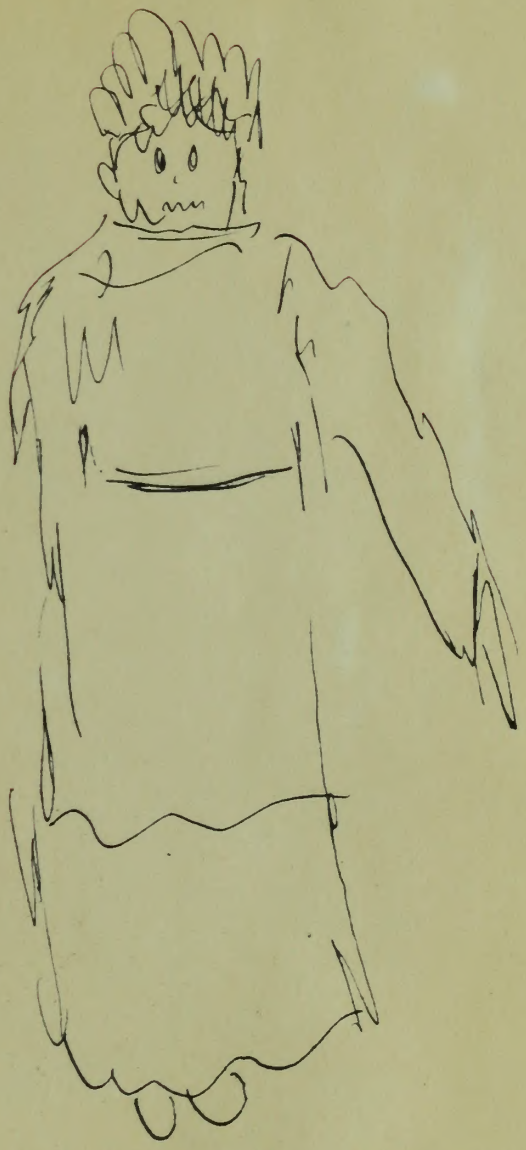
Hold the drawing of a girl in costume next to the samples shown on the following four pages. Find the sample which resembles the drawing at hand in the most respects and record the score found beneath it.



75



50



Test no. 3 Score

Each of the following questions must be answered by yes or no, in the tester's judgment, and given full or no value for each point. Check each affirmative answer.

		Points
1.	Has pupil followed directions - attempted problem asked for regardless of how well?	5
2.	Has pupil selected the essential elements of the problem even though it may be lacking in some details?	15
3.	Has pupil shown a free and consistent use of medium-pencil, crayon, or watercolor, though technique may be poor?	
4.	Does paper show direct, simple portrayal, drawing or arrangement - not worked over or erased to an undue degree?	5
5.	Does work show fresh thought or originality?	10
6.	Does work show pleasing arrangement of subject matter, margins, spacing, etc.?	10
7.	Does work show ability to discriminate differences in color?	10
8.	Has pupil a visual memory of form, as shown in this test?	15

Test no. 7 Score

Each of the following questions must be answered by yes or no, in the tester's judgment, and given full or no value for each point. Check each affirmative answer.

Points	
1. Has pupil followed directions - attempted problem asked for regardless of how well?	5
2. Has pupil selected the essential elements of the problem even though it may be lacking in some detail?	15
3. Has pupil shown a free and consistent use of medium-pencil, crayon, or watercolor, though technique may be poor?	
4. Does paper show direct, simple portrayal, drawing or arrangement - not worked over or erased to an undue degree?	5
5. Does work show fresh thought or originality?	10
6. Does work show pleasing arrangement of subject matter, margins, spacing, etc.?	10
7. Does work show ability to discriminate differences in color?	10
8. Has pupil a visual memory of form, as shown in this test?	15

Test no. 3 (cont.)	Points
9. Does work show that pupil has power of observation?	15
10. Does work show some skill in the handling of the medium used - technique?	10

Possible score - 100

Total score checked

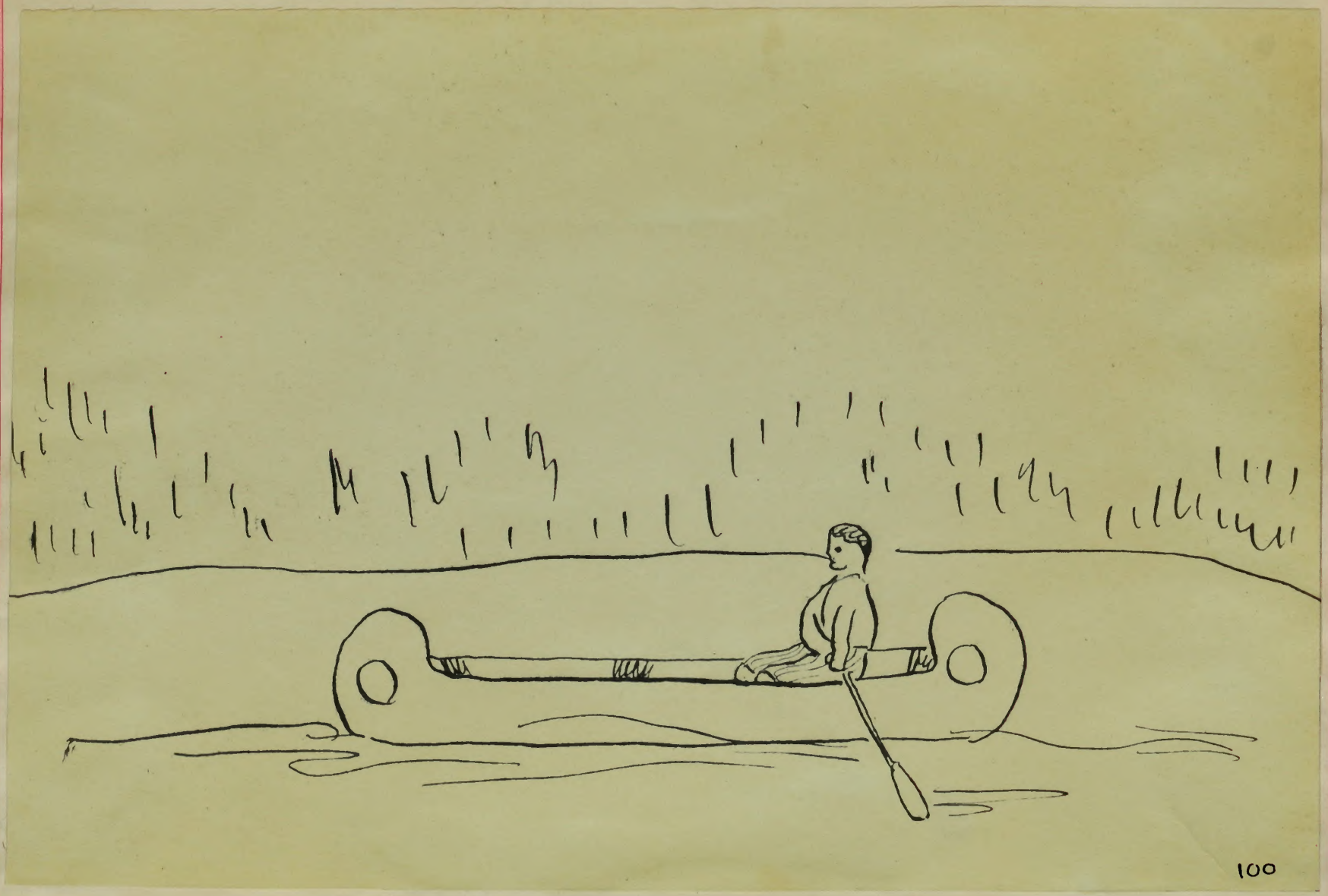
Record above

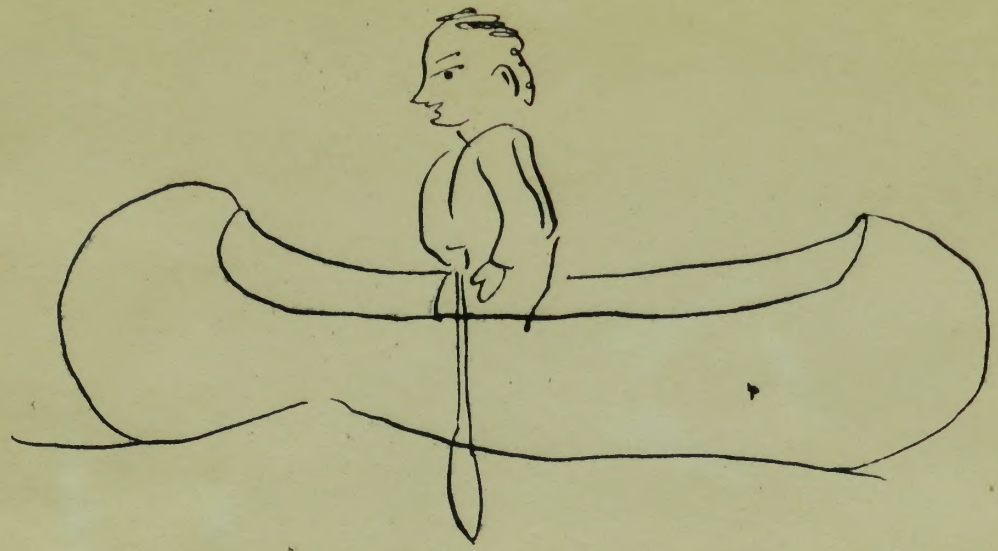
Test no. 4 Score

Hold the drawing of a boy paddling a canoe next to the samples shown on the following four pages. Find the sample which resembles the drawing at hand in the most respects and record the score found in the lower right corner.

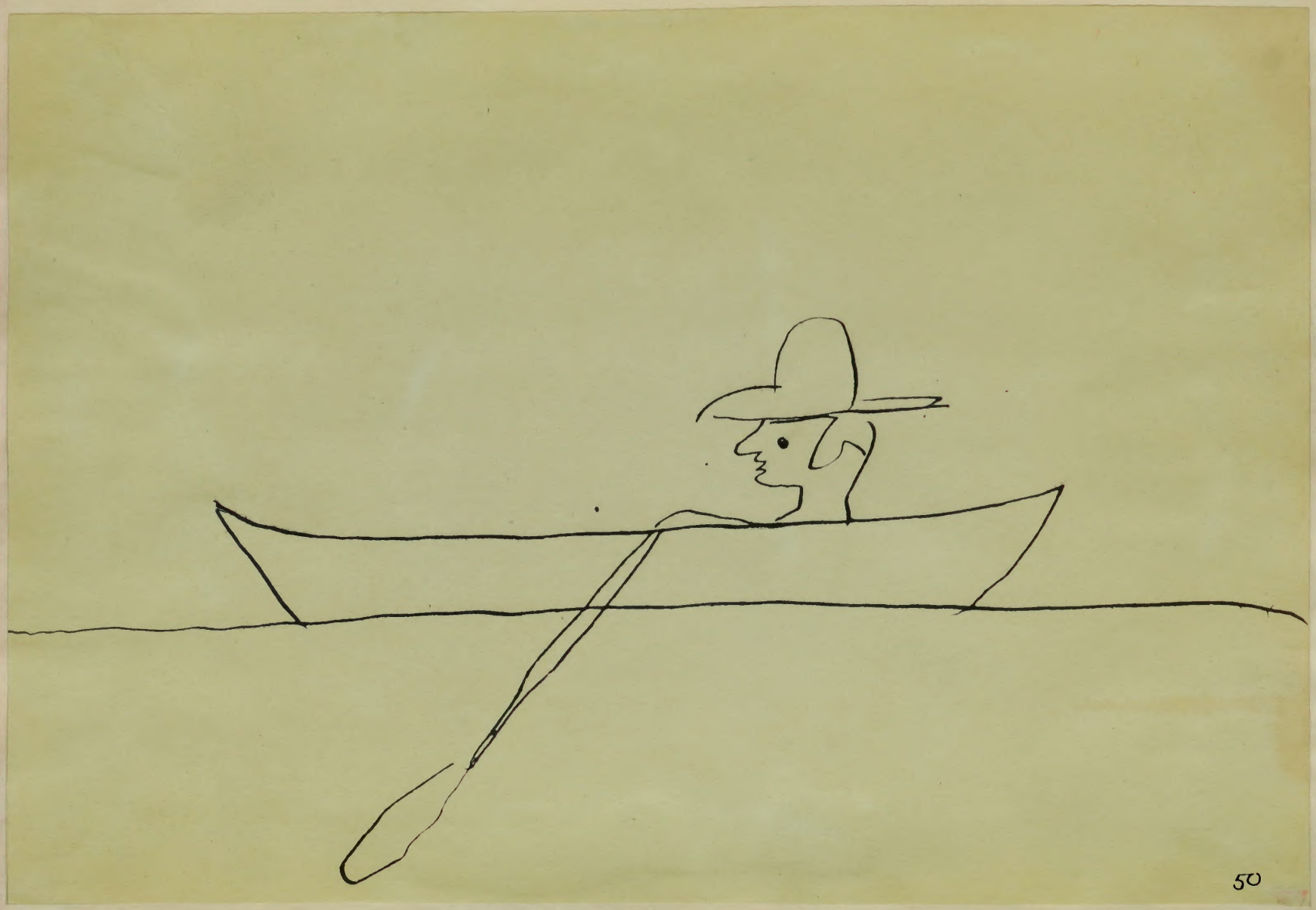
Test No. 4 Score

Hold the drawing of a boy paddling a canoe next to the samples shown on the following four pages. Find the sample which resembles the drawing at hand in the most respects and record the score found in the lower right corner.


100



75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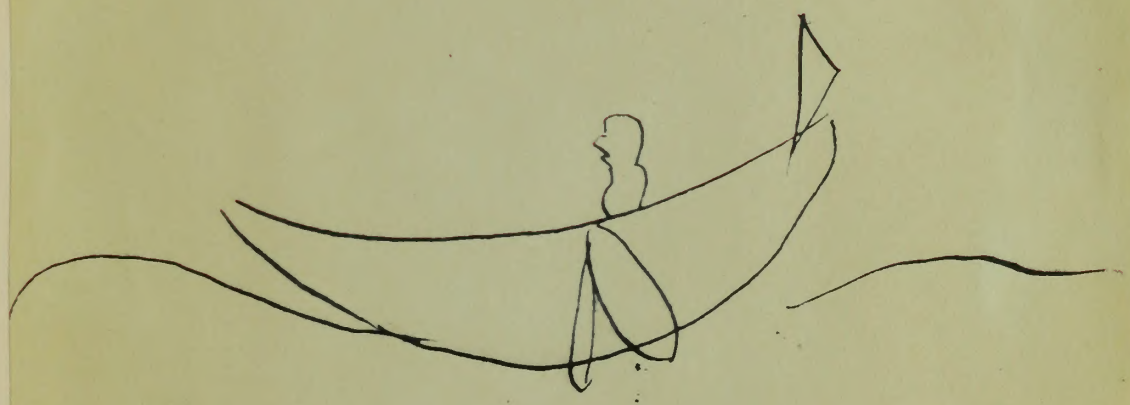


Test no.5 Score

Hold the drawing of a girl sitting at a table, eating, next to the samples shown in the following five pages. Find the sample which resembles the drawing at hand in the most respects and record the score found in the lower right corner.

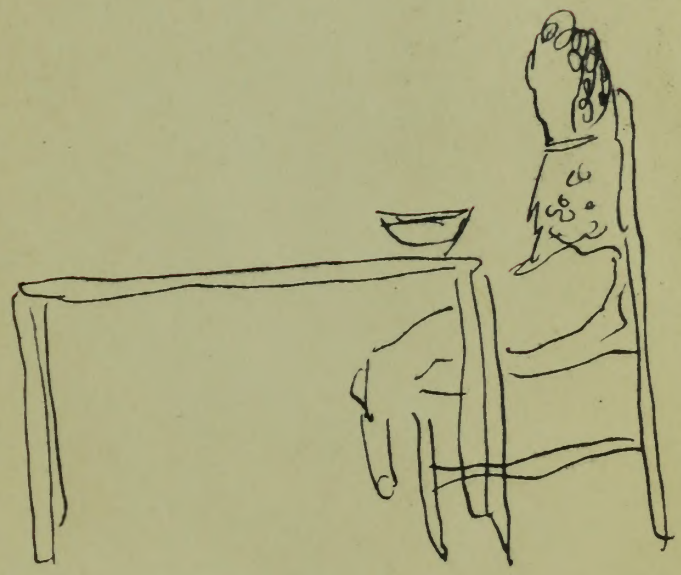
Test No. 5 Score

Hold the drawing of a girl sitting at a table, eating, next to the samples shown in the following five pages. Find the sample which resembles the drawing at hand in the most respects and record the score found in the lower right corner.

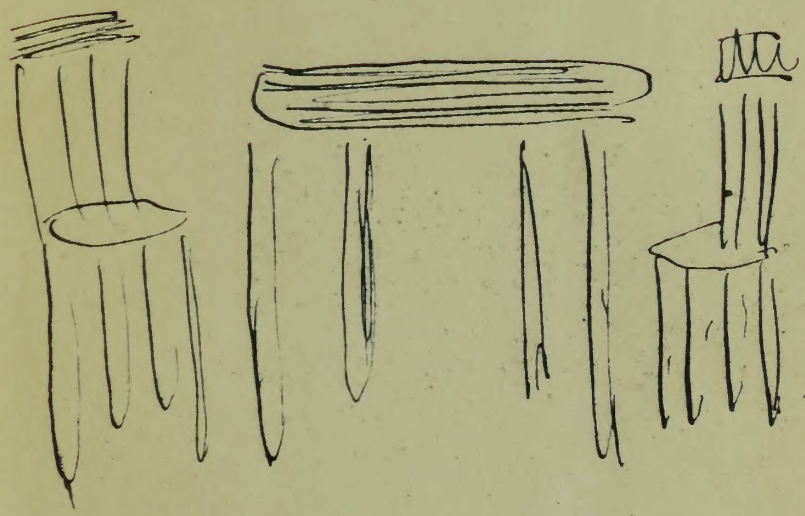
100

75

50



25



Test no. 6 Score

Hold the egg shape or oval pattern next to the four samples shown on the following page. Find the sample which resembles the pattern at hand in the most respects and record the score found within the sample.

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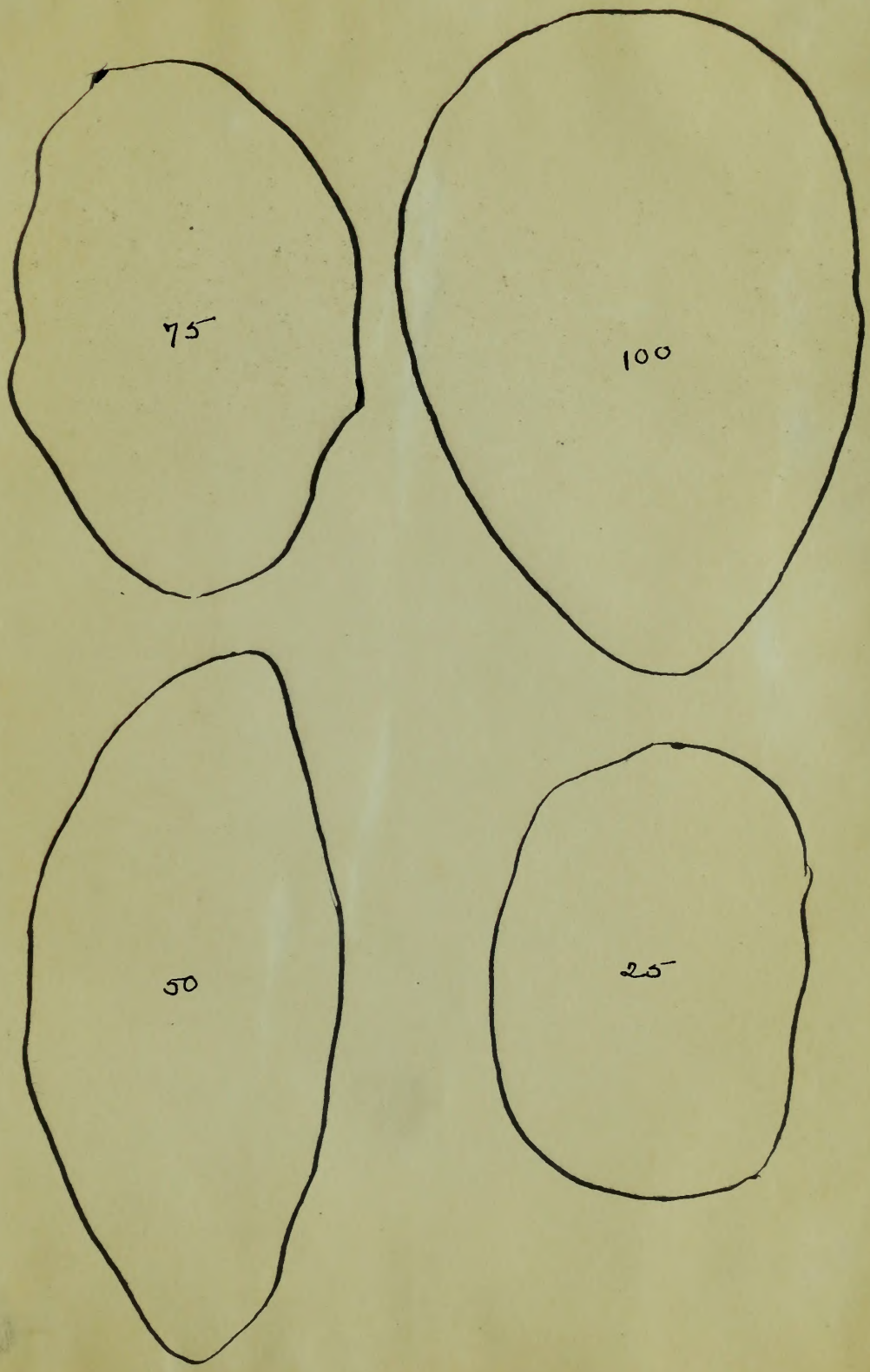
Hold the egg shape or oval pattern next to the four samples shown on the following page. Find the sample which resembles the pattern at hand in the most respects and record the score found within the sample.


75
100
50
25

Key for Scoring of Test Results

Part II

Test no. 7 Score

Hold the cut vase form next to the samples on the following two pages. Find the sample which resembles form at hand in the most respects and record the score found within the sample.

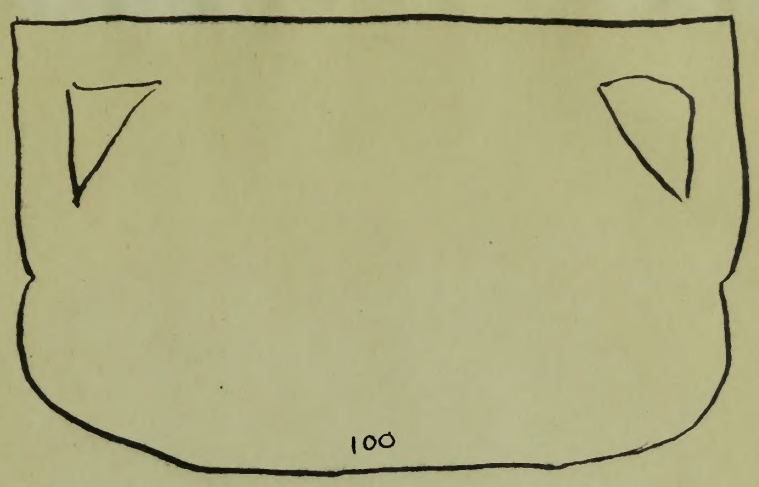
Key for Scoring of Test

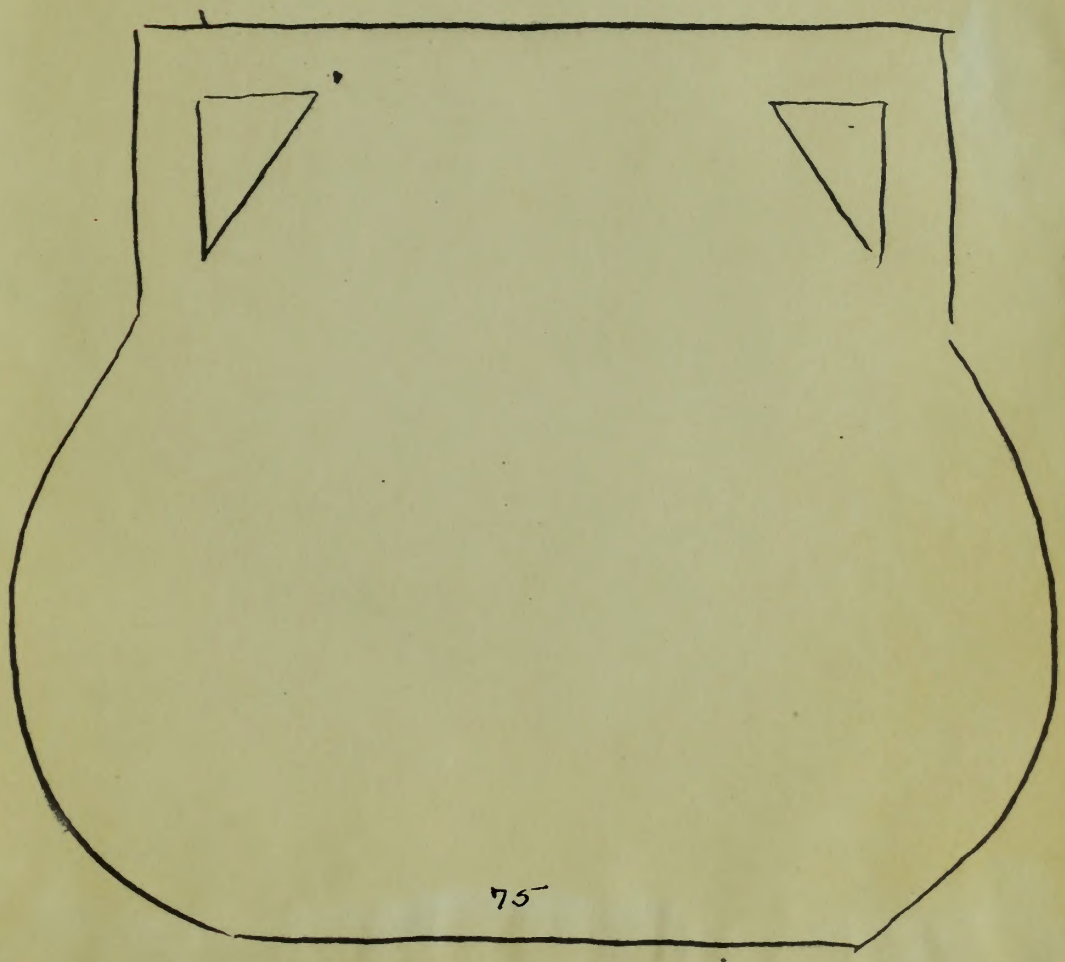
Results

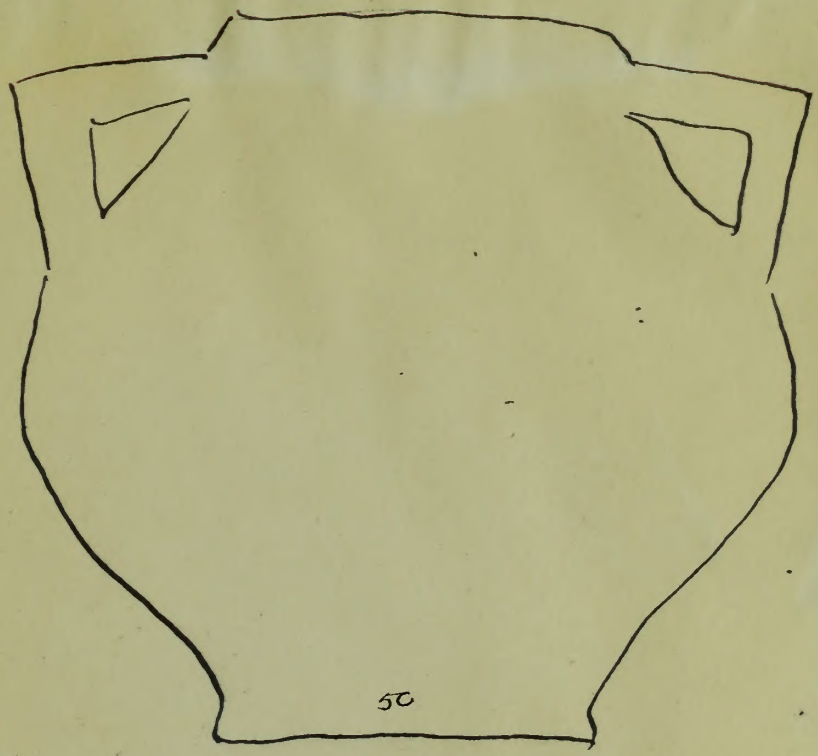
Part II

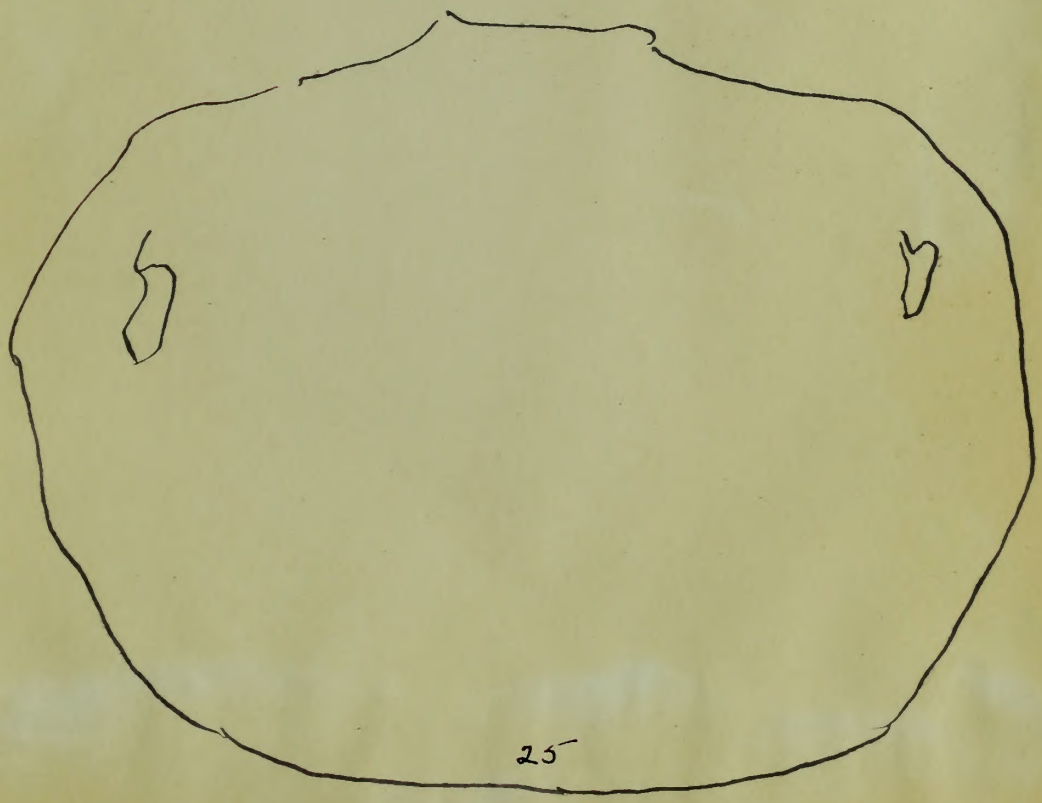
Test no. 7 Score

Hold the cut vase form next to the samples on the following two pages. Find the sample which resembles form at hand in the most respects and record the score found within the sample.


100


75


50

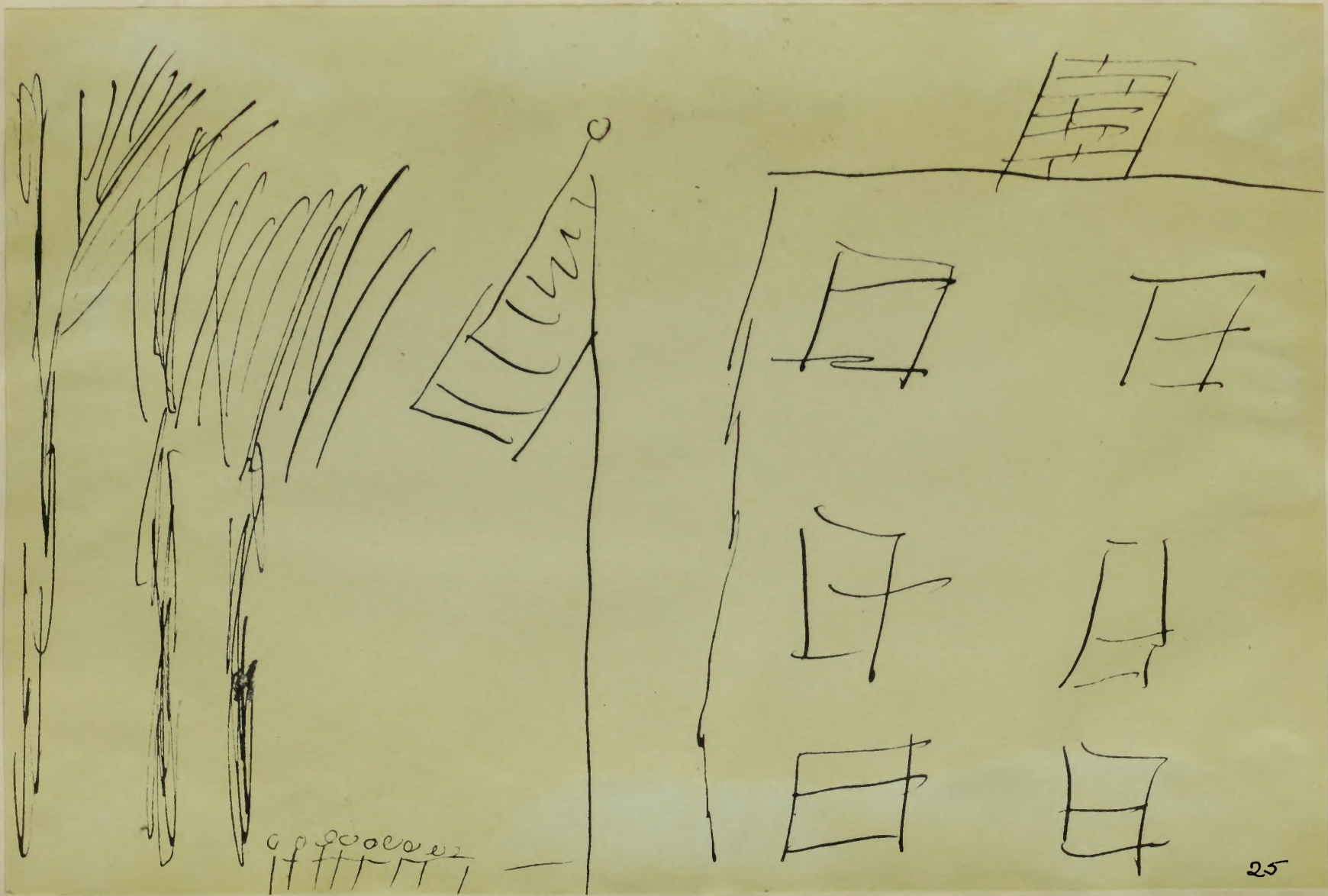

25

Test no. 8 Score

Hold the drawing at hand next to the samples shown in the following five pages. Find the sample which resembles the drawing in the most respects and record the score found in the lower right corner.


100

75


25

Test no. 9 Score

Hold the design next to the samples shown on the following five pages. Find the sample which resembles the drawing in the most respects and record the score found in the lower right corner.

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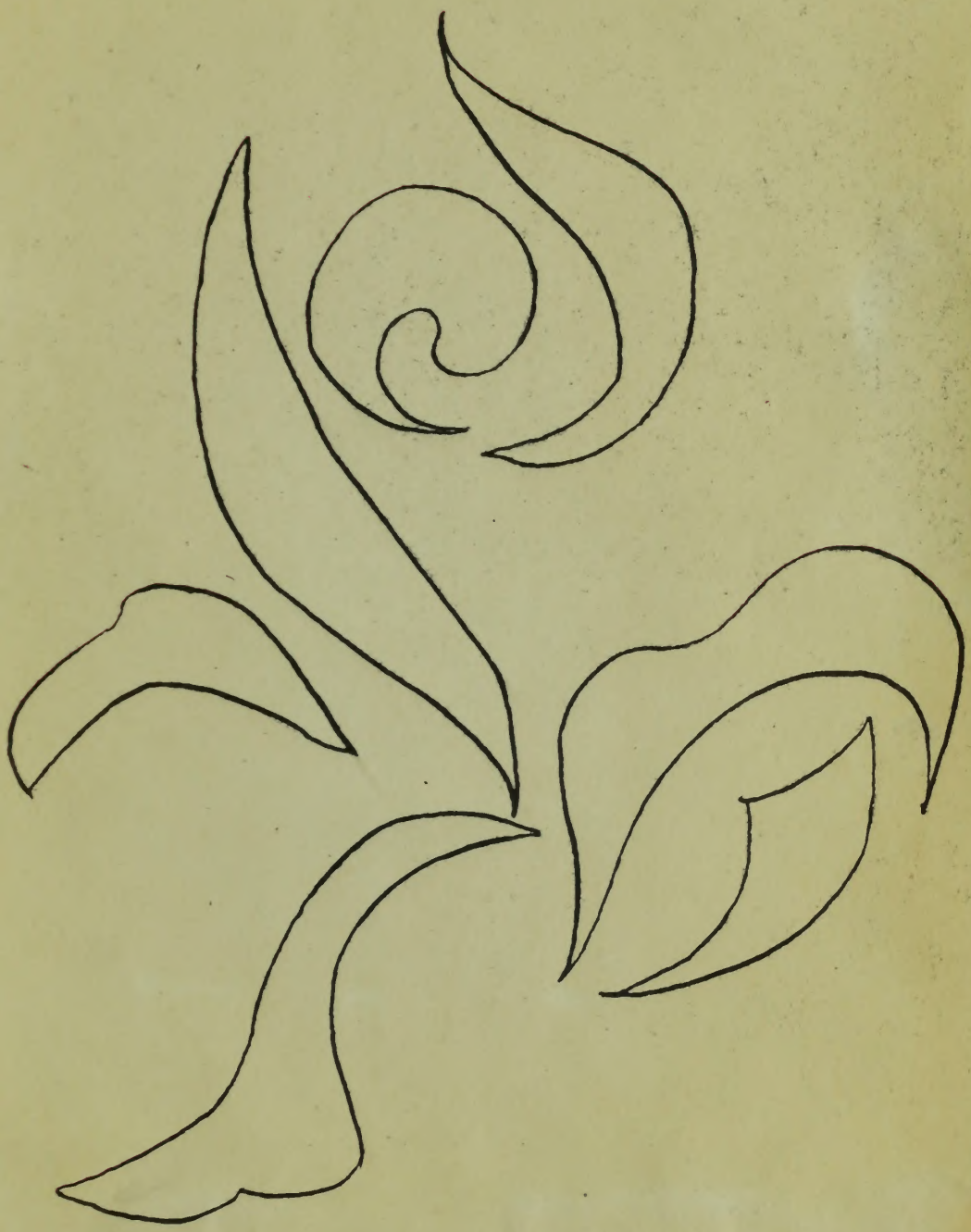
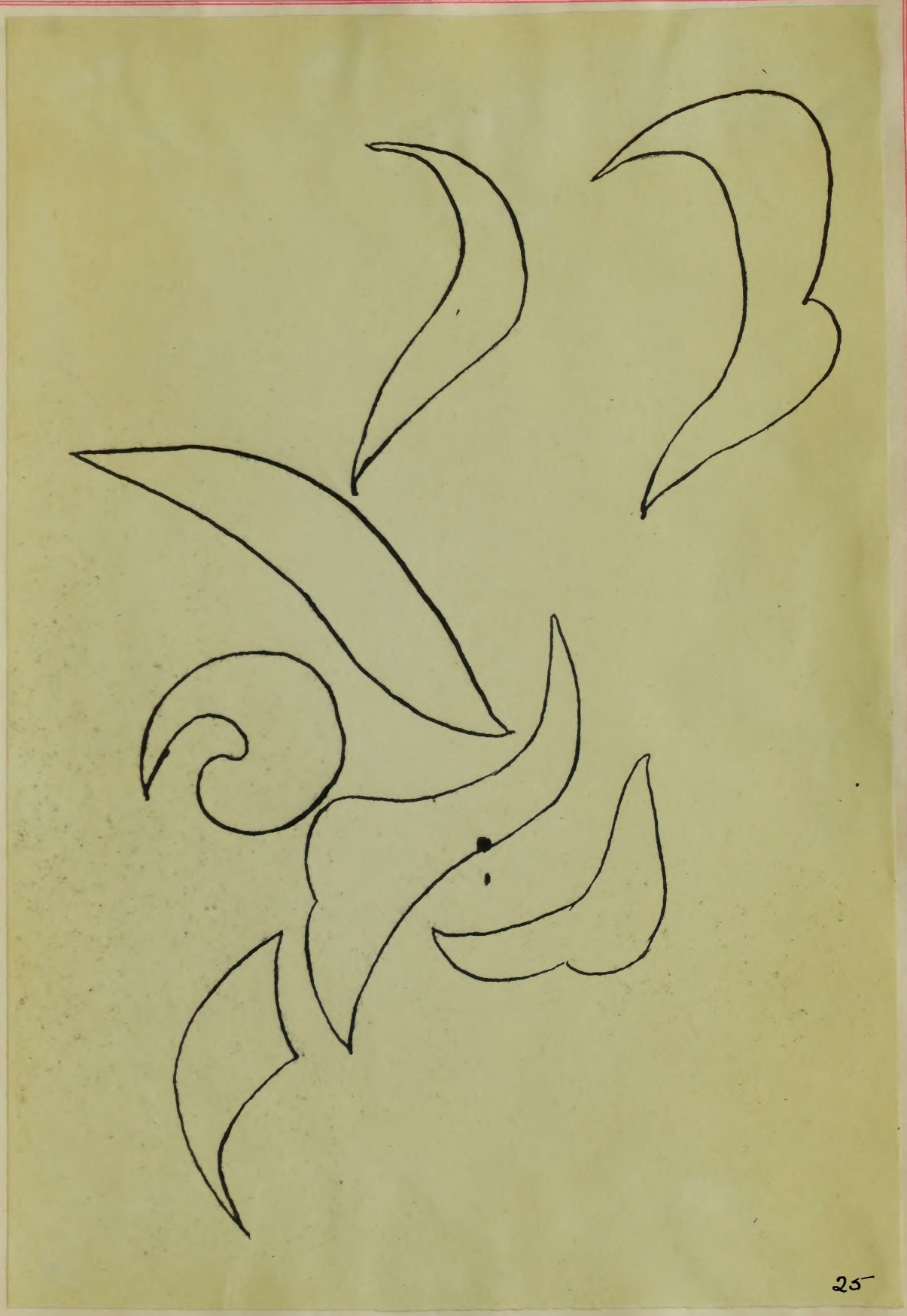
Hold the design next to the samples shown on the following five pages. Find the sample which resembles the drawing in the most respects and record the score found in the lower right corner.

100

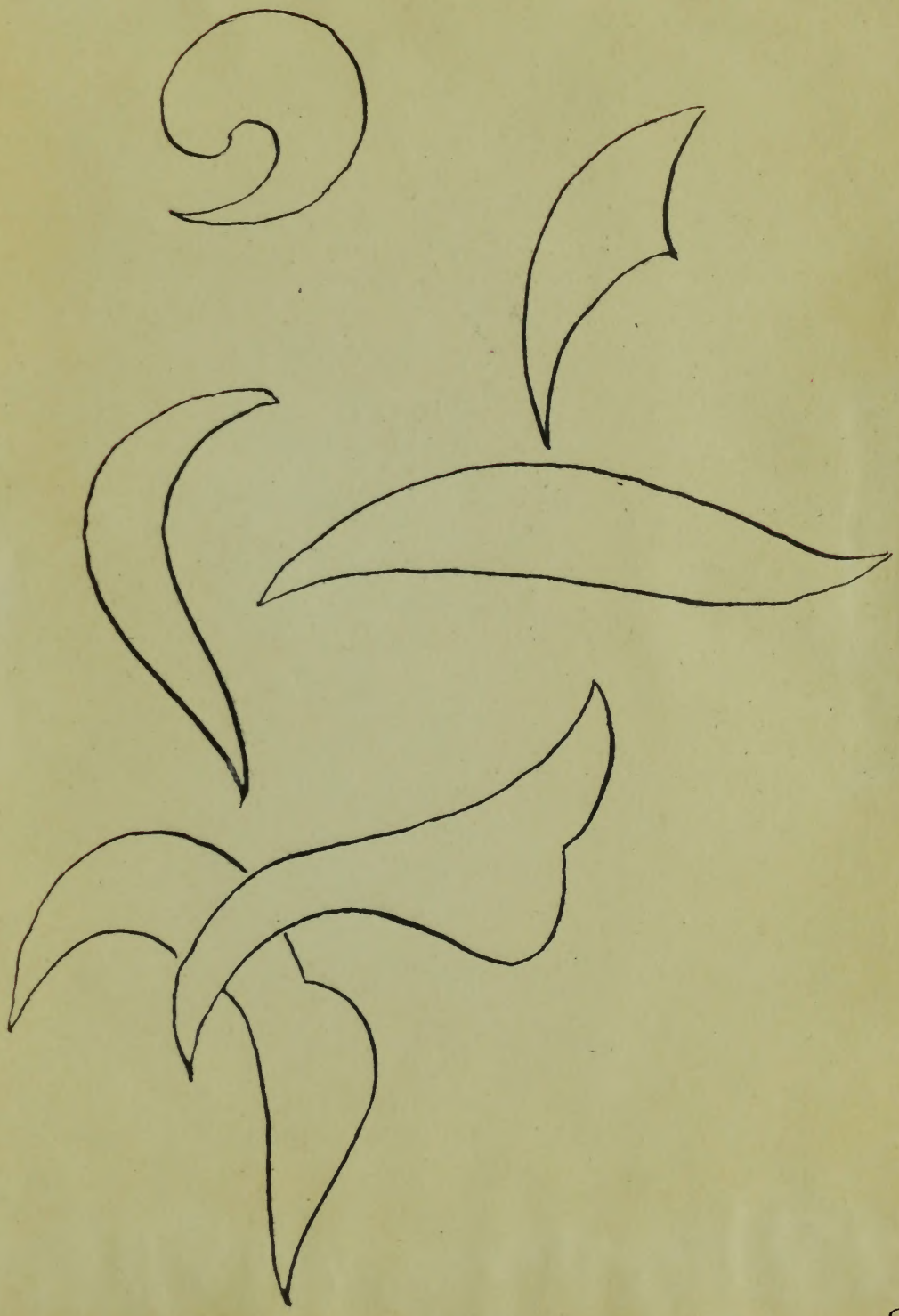
75



50



25



Test no. 10 Score

Compare diagram with that shown on the following page, which shows a perfect score of 100. Each correct name of color and each correct number following it, as shown in sample diagram, scores 10 points. Total score of correct answers and record above.

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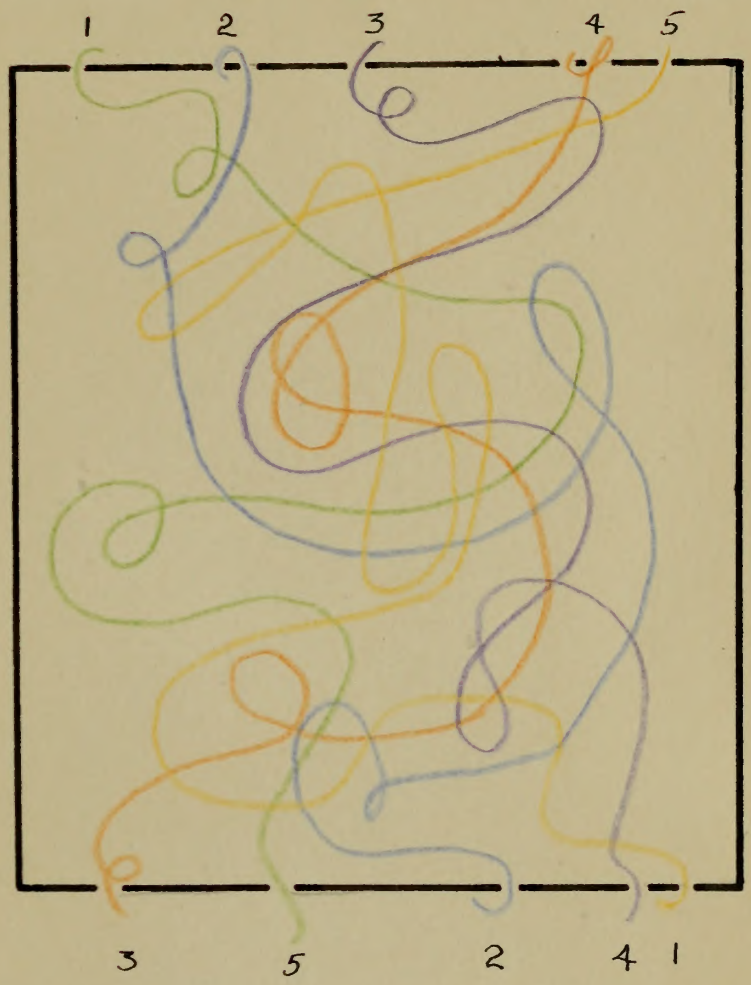
Compare diagram with that shown on the following page, which shows a perfect score of 100. Each correct name of color and each correct number following it, as shown in sample diagram, scores 10 points. Total score of correct answers and record above.



1- Green or Yellow.Green	5
2- Blue	2
3- Purple	4
4- Orange	3
5- Yellow	1

Test no. 11 Score

Hold the copied picture next to the samples shown in the following four pages. Find the sample which resembles the drawing at hand in the most respects and record the score found beneath the sample.

Test no. 11 Score

Hold the copied picture next to the samples shown in the following four pages. Find the sample which resembles the drawing at hand in the most respects and record the score found beneath the sample.

50

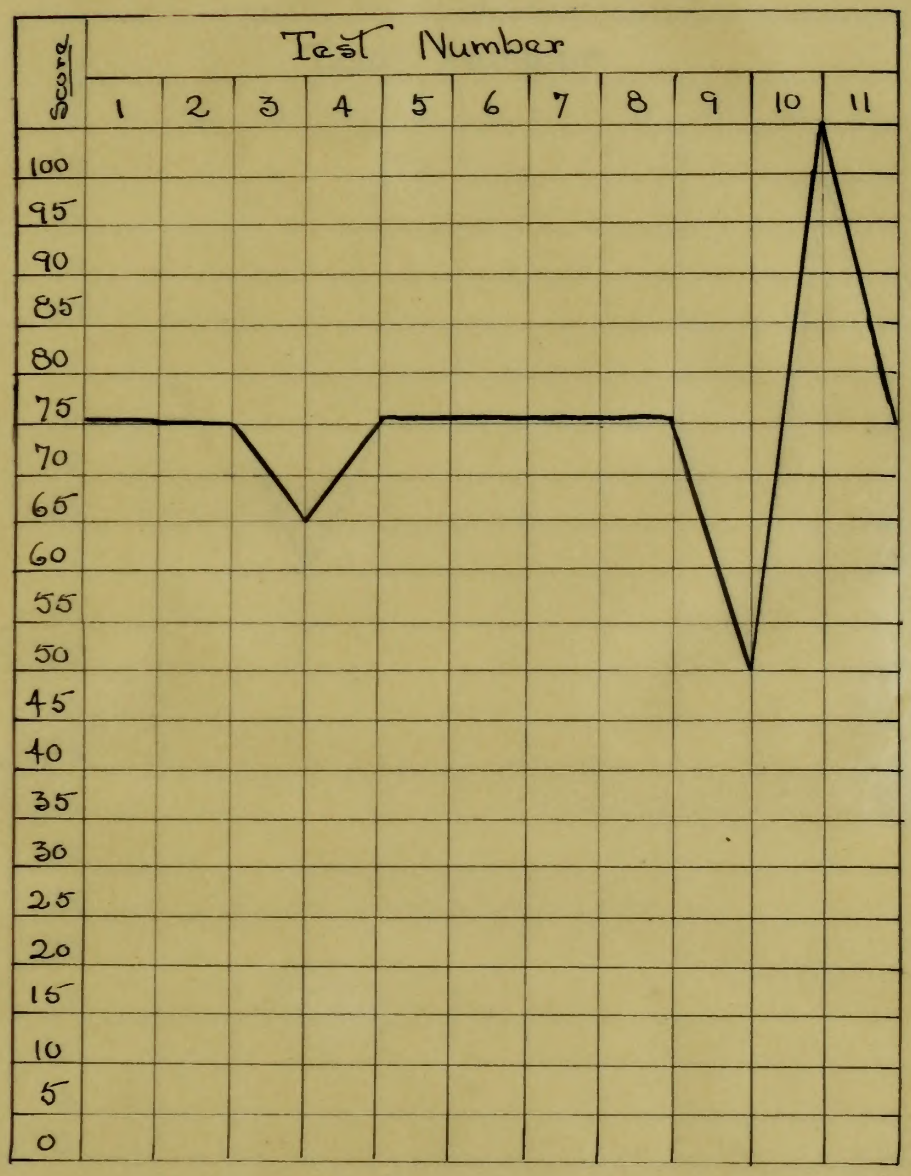


Fig. 1.- Median Pattern for Grade 7

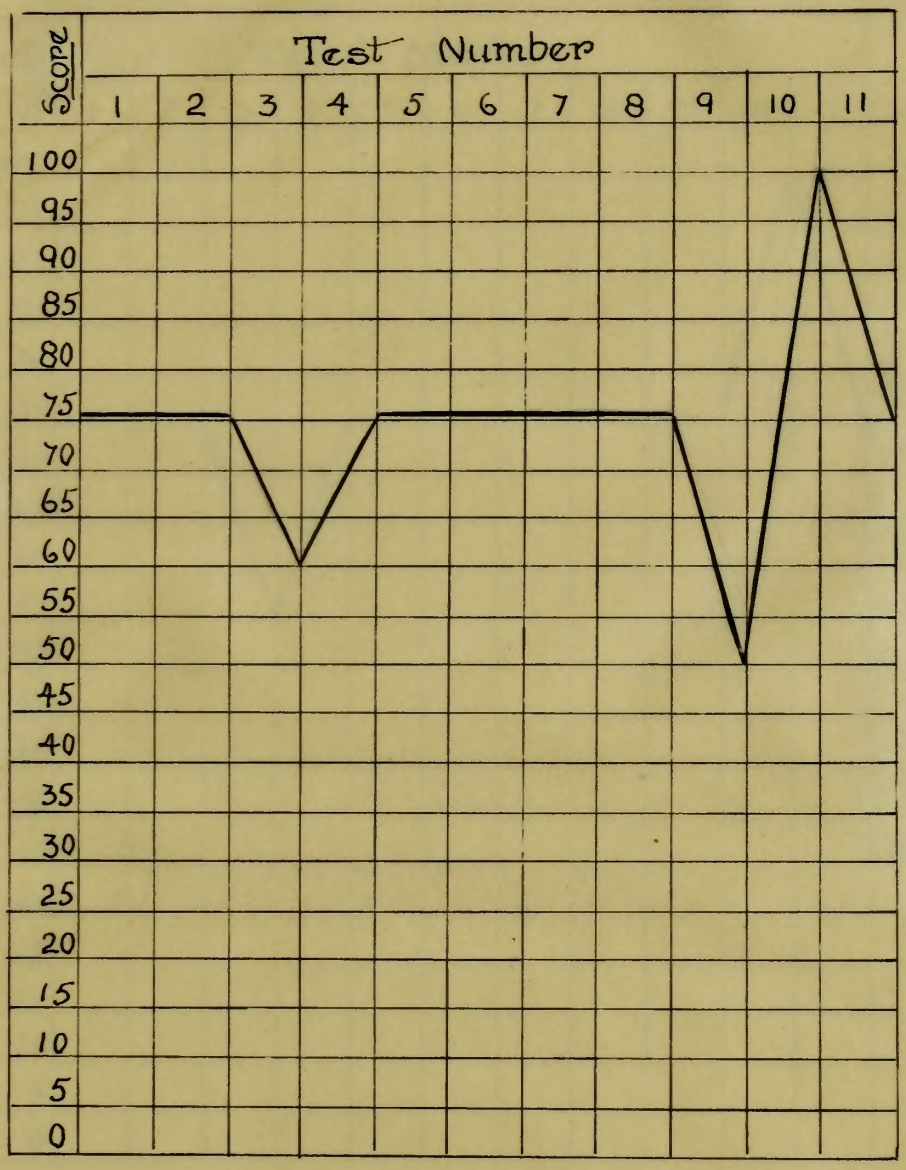


Fig. 2. — Median Pattern for Grade 8

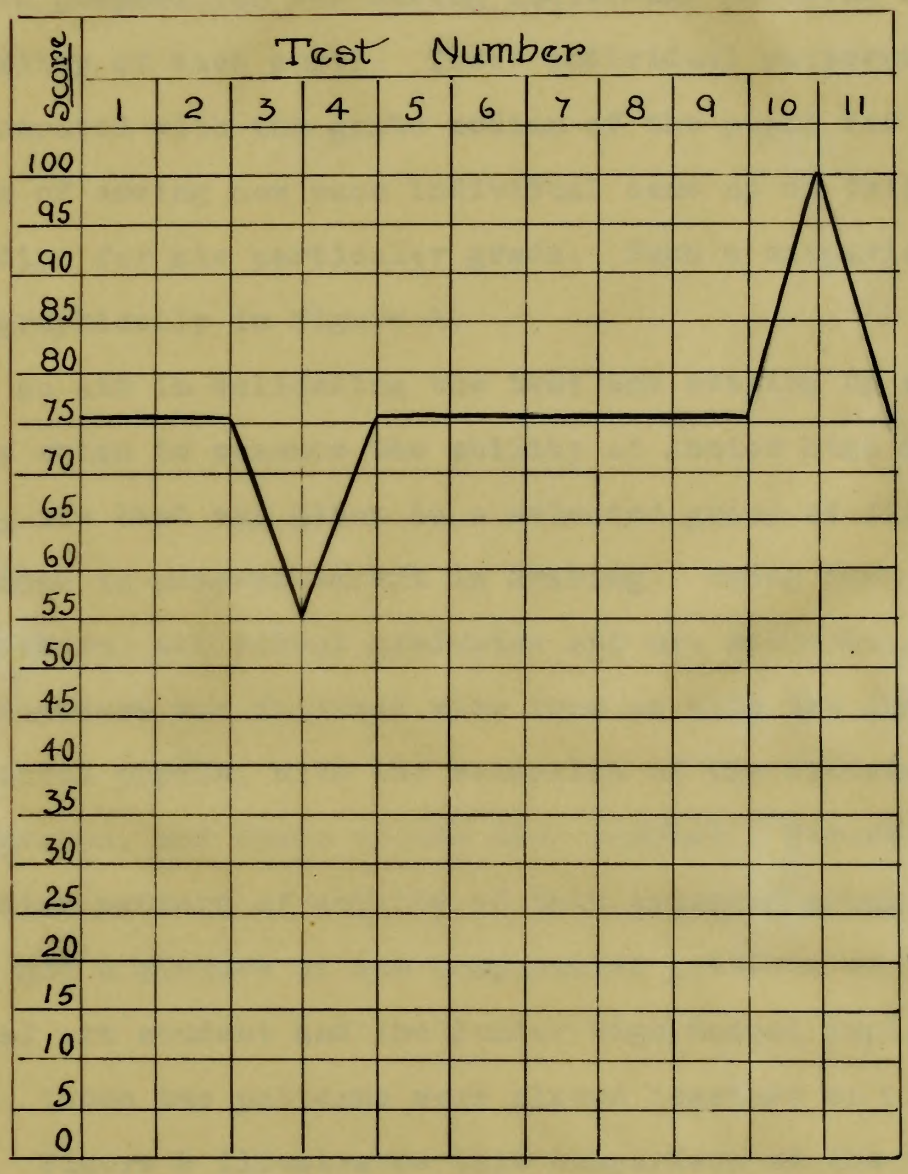


Fig. 3.– Median Pattern for Grade 9

Next, each student's entire test was gathered together and scores recorded consecutively on a separate sheet of paper in preparation for making individual patterns of the art ability of each pupil. These individual patterns were then compared with the grade median of the pupil for the purpose of seeing how each individual came up or fell below the median for his particular grade. Such a comparison is shown graphically in Figure 4.

As an aid in validating the test and setting up a pattern by which to measure the ability of Junior High School pupils, the test was given to a selected group of fifty persons known to possess talent in drawing. Among them were art teachers, art school graduates and art students. The same procedure was followed with them as with the Junior High School pupils, with the exception of the division into grade groups, and their scores were graphed. Figure 5 shows the median pattern of ability of this selected group.

To get a picture of the comparative patterns of the individual art student and the Junior High School pupil of ability, these two patterns were placed together on the same graph. Figure 6 illustrates this comparison of the two individual patterns along with the median pattern of the selected group. It is quite obvious that an individual pattern of ability will vary to a considerable degree, in some cases, from the median pattern of its class.

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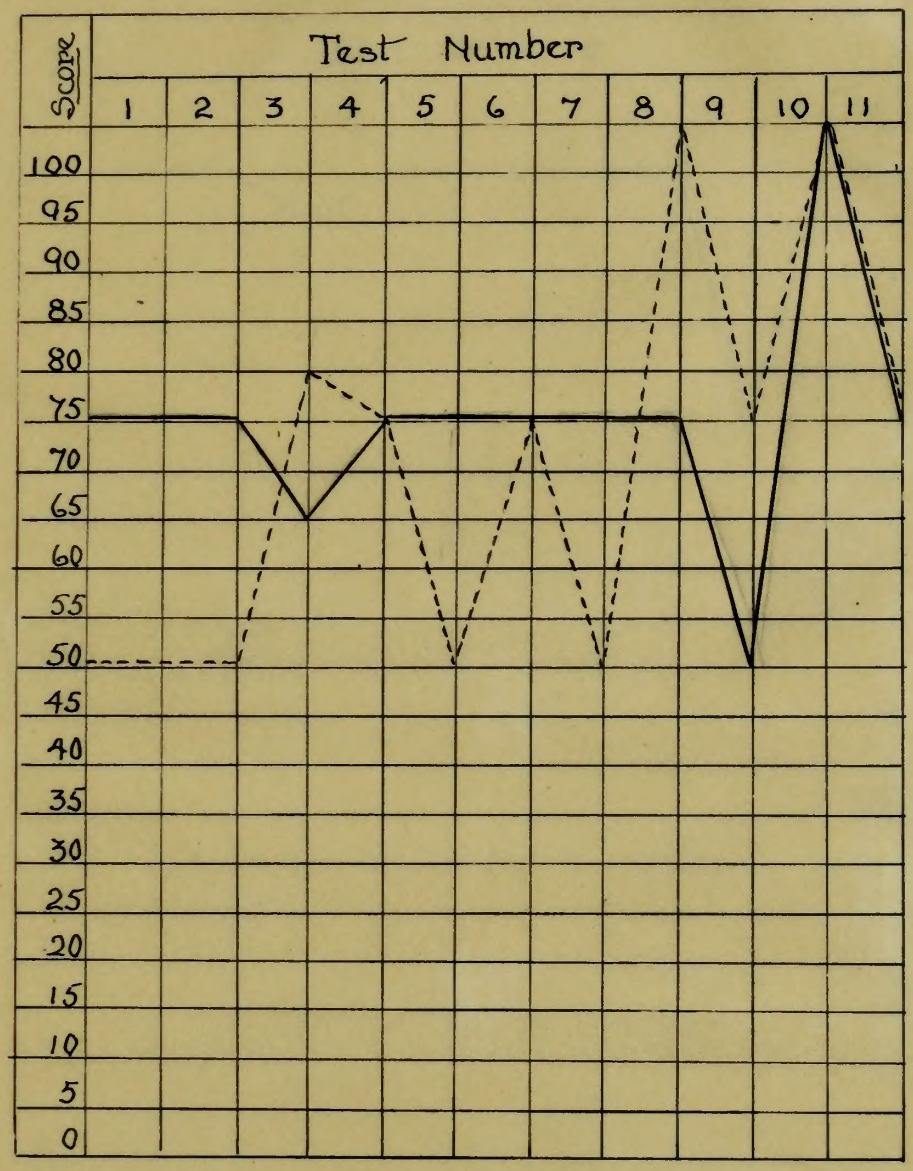

Fig. 4.— Individual Pattern of a Pupil in Grade 7 Compared with the Median of the same grade.

—— Median Pattern -----Individual Pattern

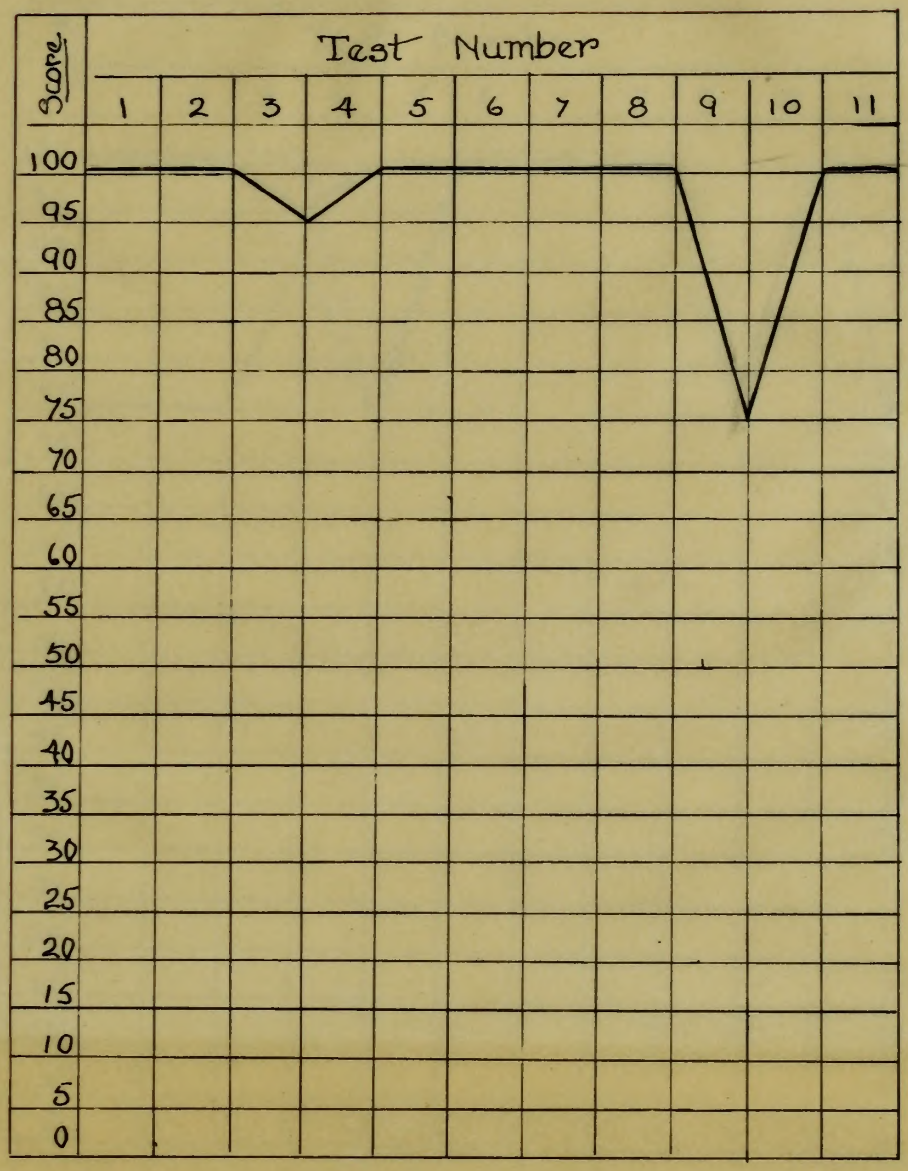

Fig. 5. - Median Pattern of 50 Persons Known to Possess Ability in Art.

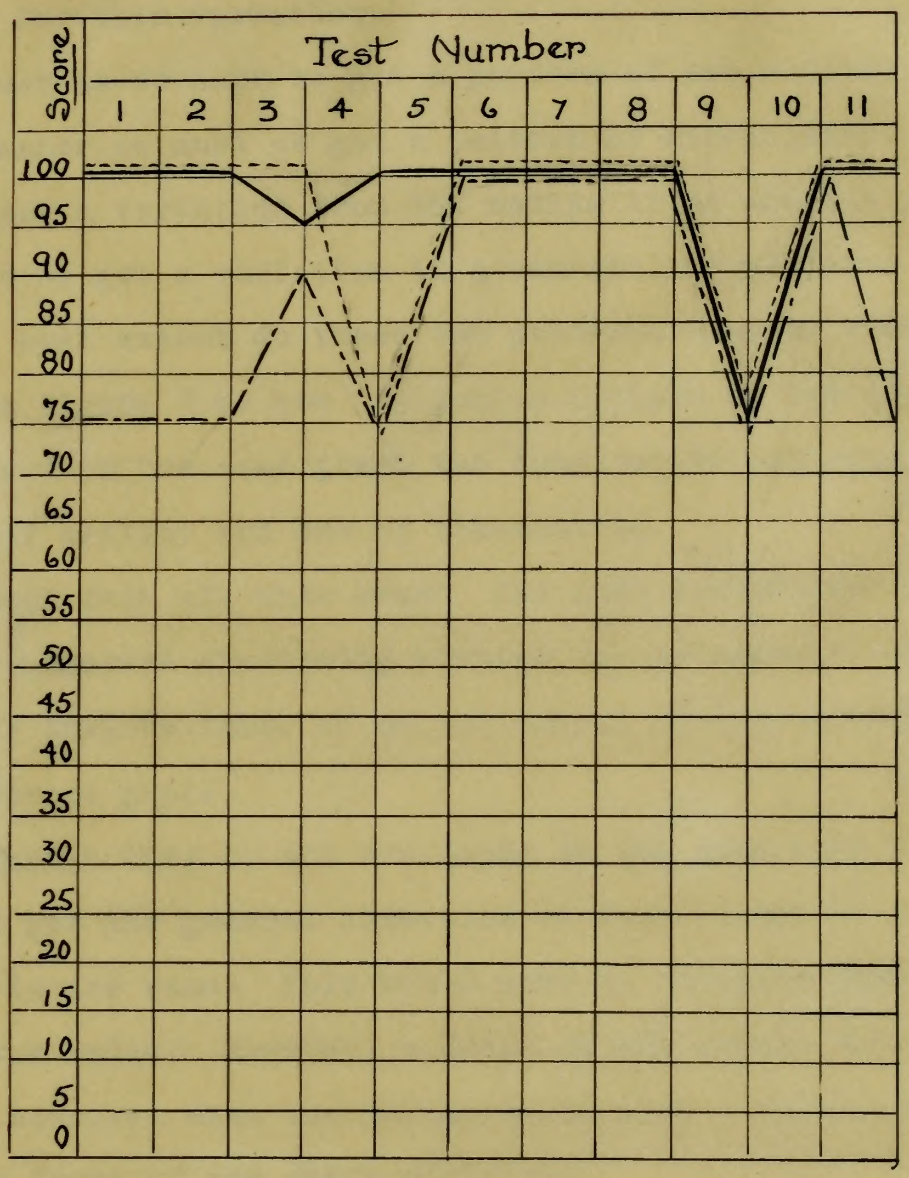

Fig. 6. – Comparison of the Patterns of a Junior High School pupil of ability and an art student, with the median of the selected group who possess art ability.

—Median ---- Art student —·—·— Junior High School student

The larger the group from which the median is deducted, the truer this becomes. The fact of individual differences accounts for this variation.

Just as we hope to get a pattern of art ability in this manner so must we get a pattern of non-ability. Also, if we get a variation from the median in an ability pattern so must we get a variation in a non-ability pattern. How and to what extent do these two patterns vary or conform?

In Figure 7 we see the median pattern of the ninth grade and in the same graph the comparative patterns of a pupil of ability and one of non-ability.

What does all this mean? The most significant factor is the apparent similarity between the patterns of ability, whether they be those of an art school student or a Junior High School pupil.

Though they do not run along on the same high score range, yet the general direction of their lines or patterns is the same. This would seem to indicate that the test was valid. However, a graph of all pupils taking the test, compared with the median would give a better picture of the truth of the above statement.

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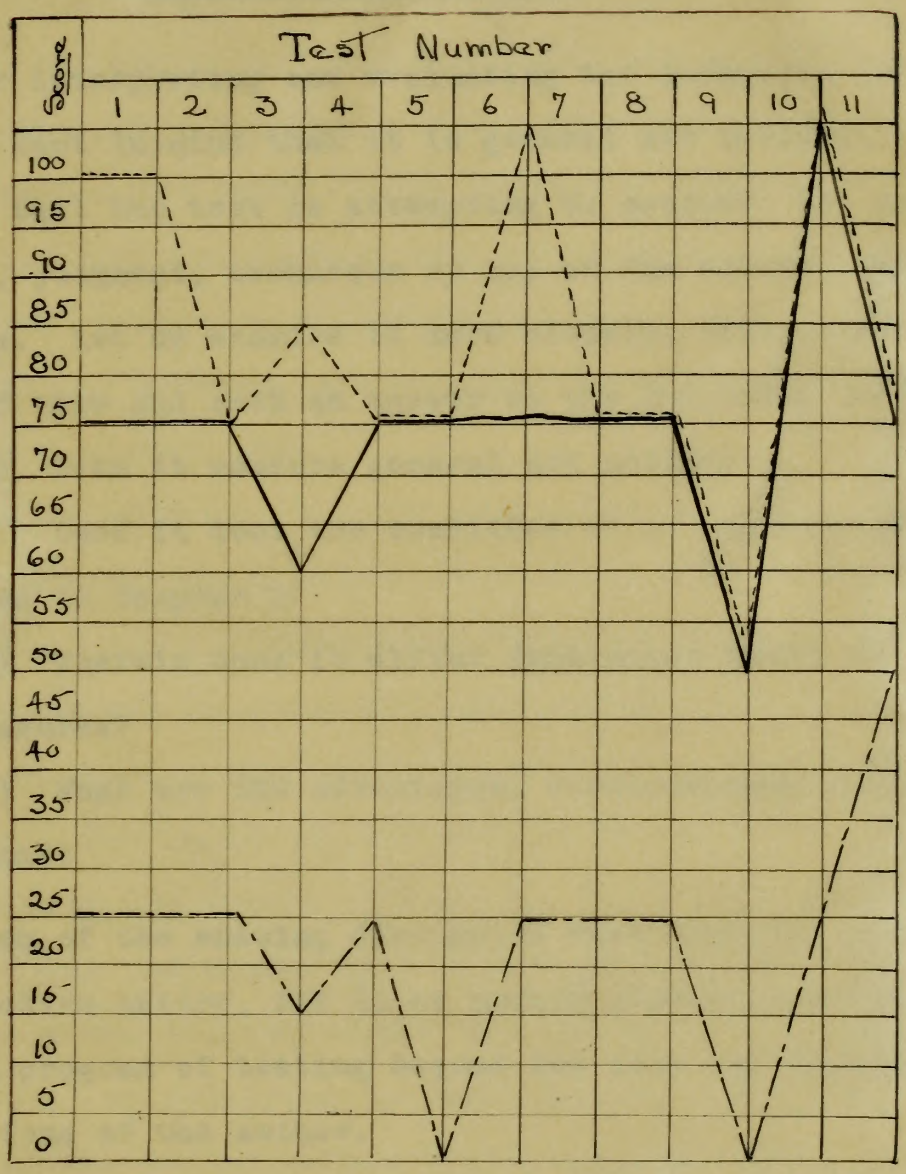

Fig. 7.- Comparison of the Patterns of a pupil of ability and one of non-ability with the appropriate grade median - grade 8

—— Median ------ Pupil of ability —·—·— non-ability

V

Interpretation of Test

For interpreting and evaluating the foregoing test it must be kept in mind that it is general art ability, primarily, that the test is attempting to measure, not appreciation, judgment, technique or any of the special art abilities. Let us examine it more closely, then, from this point of view and seek an answer to the following questions:

(1) Does it measure general art ability?

(2) Does it test the qualities of art ability as set down in chapter I?

(3) Wherein does it differ from other tests and measures?

(4) What are its advantages, disadvantages and limitations?

Much of the ensuing discussion must necessarily be of a subjective nature, for to be purely objective would preclude a program of testing beyond the time and financial limitations of the author.

To answer question (1) in the affirmative or negative would be presumptuous at this stage. It would also eliminate further discussion of the real problem of the thesis, as found on page iii, in the introduction. However, it is safe to say, perhaps, that the test seems to be a measure

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of general ability when one notes that the elements or component parts of general art ability as listed and accepted in Chapter I, pages (2) and (3), have been the keynote upon which the whole test has been built and judged.[1] In the varied test subjects, the matter technique has been the test consideration for merit, while questions concerning mediums, mechanical ability, design, etc., have been secondary to such mental qualities as memory for form, understanding and attempting of problem, manipulative forms, new arrangement of subject matter, etc.

This being true, it would tend to be a test of general ability in art rather than a specialized one. There is an underlying emphasis throughout, however, which is not actually apparent in a superficial examination of the subject matter involved. What this emphasis is, could be better explained in the answer to the next question.

To check the answer to question (2) I have arranged the test so that the number of each test corresponds to the number beside the quality of art ability listed in Chapter I, pages (2-3). By referring to this list one may readily see what quality, in the author's judgment, is being tested, thus enabling him to better examine the result.

As was noted earlier in this thesis,[2] eight out of the thirteen characteristics of art ability listed by Manuel

1. Chapter V, pages 76 - 81
2. Chapter III, page 16

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1. Chapter V, pages 72-80
2. Chapter III, page 16

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The test differs from practically all others examined, primarily in one respect i.e. the scale set up by which its results are measured.

The procedure for building the scale used was as follows:

First, all drawings of each test were examined carefully with a view to finding out whether the problem or question pertaining to the particular test had been answered, or attempted. If so, such drawings were put in one pile and those not answering the problem in another.

Secondly, from those answering the problem were selected the drawings which, in the author's opinion, seemed to grasp the essential elements of the test subject, the writer paying no attention to minor details of color, proportion, design, etc.

Again the papers were examined for comprehension of finer elements of test subject matter, - discrimination in color, proportion, form, margins, neatness, with no attention yet to originality or fine detail.

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Again the drawings were examined, this time for

freshness of thought, new arrangement of familiar material, originality.

Last of all, they were judged from the standpoint of drawing technic.

Having so grouped all the test results, the next step was to examine and classify all drawings within each group in an attempt to give a valuation or score. Because of the subjectivity of such a procedure, exact scores, or objective scores and their resulting patterns are necessarily unscientific, but for lack of time required for a scientific procedure, this seemed to the writer to be the only logical alternative.

The drawings were thus graded in most cases into four groups as in tests 1, 2, 4, 6, 7, and 11, and given scores of 100, 75, 50, and 25, as in the writer's opinion they merited such scores. Where a score of 0 was given, as in tests 5, 8, and 9, it was for the benefit of anyone else who might be scoring the test, to show where a pupil had done perhaps considerable drawing, perhaps of good technic, but had not answered the original question or problem. The zero scores in tests 3 and 10 simply indicate nothing at all was attempted.

Finally, from these various groups, was selected the typical drawing best illustrating the type found in each group. These drawings were the ones used in the scale given in Chapter IV.

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This scale was selected after an examination of 17,000 test results from pupils of Junior High School range. Thus a measure has been set up which seems typical of a cross section of art ability in the Junior High School range. It is a measure for and of students' ability, not that of adults.

Again, it differs in the degree to which the mental aspects have been stressed over and above technique. Also, the variety of subject matter used to test merely general art ability is a feature which adds to its validity, a feature lacking in many tests.

The advantages of the test are as follows:

1. It may be given to any size group, as a group test or as an individual test.
2. It contains a variety of test subjects.
3. It is not limited to any particular medium so is adjustable to the equipment of any Junior High School.
4. Most of the test subject matter has been selected from material common to the experience and environment of pupils, yet not used in the class room as subject matter.
5. Because of the lack of limitation in mediums and subject matter, pupils have a better than ordinary chance for freedom in expression.

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The disadvantages of the test follow:

1. In trying to achieve objectivity in scoring, subtler shades of differences and judgment are ruled out.
2. Even though the method of scoring is more objective than many, it still is very subjective in that the final judgments are dependent wholly upon the one scoring the test, and that one may or may not be wise.
3. It takes two different periods to complete.
4. It takes from 15 to 35 minutes to score the entire test.

The chief limitation of the test is the fact that the drawings are done in various mediums while they are judged against samples done in ink only. This makes comparisons more difficult.[1]

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VI

Establishing Patterns of Art Ability

The entire test for general art ability[1] was given to 1600 pupils in the Junior High Schools in greater Boston with a view to charting what may be called a picture of art ability from the results obtained. The tests from the seventh, eighth, and ninth grades were separated, then each individual test separated and placed in individual groups according to the score achieved.

As a result of this procedure it was found possible to make a graph or picture of the median scores in each individual test for each grade as seen in figures 1, 2, and 3.

For fuller details and figures see frequency tables showing total numbers of pupils in each grade, numbers achieving each score, and the medians derived.[2]

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1. Chapter IV, pp. 21-23
2. Appendix, pp. 103-113

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1. Chapter IV, pp. 91-113
2. Appendix, pp. 103-115

VII

Prognostic Value and Educational Significance of Test Results

It is very doubtful if any prognostic or aptitude test can assure success on the strength or findings of the test alone. I do not claim that the test for general art ability given in chapter V, adequately measures art ability or that success in the field of art can be vouched for as an outcome. I do claim, however, that when wisely given, scored and graphed, the resulting pattern will be a fair indication of the general art ability or non-ability of the pupil. This statement seems justified after a careful examination of the ability patterns in chapter VI. The median pattern of the selected group known to possess ability in art, and those for grades 7, 8 and 9, run along in a similar line, as shown in figures 1, 2 and 3. This is a fair indication of the validity of the test and establishes a foundation on which to base further claims.

It must be kept clearly in mind at all times, however, that the test is one for general art ability only. It has no prognostic value whatever for any specialized field of art. For such, appropriate tests have, in some cases been devised to fit the special ability involved.

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It is very doubtful if any prognostic or aptitude test can assure success on the strength of findings of the test alone. I do not claim that the test for general art ability given in chapter V, adequately measures art ability or that success in the field of art can be vouched for as an outcome. I do claim, however, that when wisely given, scored and grouped, the resulting pattern will be a fair indication of the general art ability or non-ability of the pupil. This statement seems justified after a careful examination of the ability patterns in chapter VI. The median pattern of the selected group known to possess ability in art, and those for grades 7, 8 and 9, run along in a similar line, as shown in figures 1, 2 and 3. This is a fair indication of the validity of the test and establishes a foundation on which to base further claims.

It must be kept clearly in mind at all times, however, that the test is one for general art ability only. It has no prognostic value whatever for any specialized field of art. For such, appropriate tests have, in some cases been devised to fit the special ability involved.

In discussing the prognostic value of the test for general art ability, the procedure generally used by the

scientist i.e. that of discussing first the negative side of the problem then the positive is followed. Judging from its apparent validity, it seems safe to say that a graph or pattern which varies widely, or which seems to bear little or no relation to the appropriate grade median, would indicate very little general art ability. A pupil having such a pattern would find little success or pleasure in a general art course. Especially does this seem true when one recalls the fact that two thirds of the test deals with mental qualities or functioning, a factor which education can do little, if anything, to change. Education can develop and perfect technique. A pupil having a pattern such as the last graph on Figure 7, should be advised not to waste his time in a general art course.

Just as a pattern varying widely from the median seems to indicate lack of general art ability, so one which closely resembles the median would seem to be an indication of ability. A pupil having a pattern such as the top graph on Figure 7, could well be advised to follow his artistic inclinations.

In between these two extremes prognosis is more difficult and less reliable. However, if two thirds of the pattern seems to follow the appropriate median, it seems probable that the pupil has ability enough to be allowed to take a general art course with the expectation of success.

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On the other hand, a pattern that varies widely for two thirds of its course seems sufficient evidence to discourage a pupil from entering upon a general art course.

The limitations of the test itself prevent finer degrees of prognosis, but its use as a teaching aid increases its value and significance. For example, a teacher in a general art course, which is compulsory, not elective, could well give the test, graph the results, compare pattern with the appropriate grade median and by referring from the test number to the corresponding number indicating the quality being tested,[1] check up on the individual strengths and weaknesses of the pupil, and give special help where needed.

In addition to its possibilities for individual diagnosis and aid, the results, if viewed collectively, will give a picture of the general needs of the class, from which a teacher may build a plan of instruction better adapted to the needs of her class than an arbitrary course of study.

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1. See Chapter I, pp. 2-3

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1. See Chapter I, pp. 2 >

Summary

As a result of the study involved in this thesis and its findings therefrom, the outstanding facts may be summarized as follows:

1. General art ability lends itself to analysis.

2. Analyzed, it is found to consist of thirteen measurable characteristics.

3. Practically two thirds (8 out of 13) of these characteristics are purely mental qualities while only five are physical.

4. Present art tests do not seem to be measures of fundamental ability.

5. Through the construction of an ability test as given in this thesis, and a program of testing to determine its validity, it is found possible to measure general art ability.

6. Prognosis on the strength of the test is possible within certain limits.

7. Aside from prognosis, the test serves as a teaching aid.

It is earnestly hoped that this thesis may prove of some assistance to students and teachers of art education in bringing together much material hitherto widely scattered and unrelated in character. The test for general

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It is earnestly hoped that this thesis may prove of some assistance to students and teachers of art education in bringing together much material hitherto widely scattered and unrelated in character. The test for general

art ability is by no means considered by the author as a final contribution to the field, but merely as a possible justification of the criticism of previous tests and an indication of the possibilities of further development.

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APPENDIX

On the following pages are shown the frequency tables from which the medians were derived and the scale constructed. These tables show the total number of pupils in each grade, the number of pupils achieving a particular score in the test and the median derived. They show the same figures for the selected group of art students and teachers.

Score	Grade 7	8	9	Art Teachers
100	50	90	28	36
75	460	302	292	12
50	130	94	60	2
25	35	39	20	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test I

Score	Grade 7	8	9	Art Teachers
100	50	90	28	36
75	460	302	292	12
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Totals	675	525	400	50
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25	25	39	20	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test II

Score	Grade 7	8	9	Art Teachers
100	74	101	39	37
75	440	299	295	12
50	128	92	46	1
25	33	33	20	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test II

Score	Grade 7	8	9	Art Teachers
100	74	101	79	37
75	440	299	295	12
50	128	92	46	1
25	33	33	20	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test III

Score	7	8	9	Art Teachers
100	3	5	2	12
95	2	2	1	28
90	14	8	2	2
85	20	18	5	5
80	50	22	12	1
75	81	50	30	1
70	124	72	43	1
65	273	98	52	0
60	76	179	60	0
55	38	30	154	0
50	2	15	23	0
45	1	13	8	0
40	3	7	5	0
35	2	1	3	0
30	2	0	1	0
25	1	1	1	0
20	1	2	1	0
15	1	1	0	0
10	1	0	1	0
5	0	0	0	0
0	0	0	0	0
Totals	675	525	400	50
Median	65	60	55	95

Table for Test III

Score	7	8	9	Art Teachers
100	3	5	2	12
95	2	2	1	28
90	14	8	2	2
85	20	18	5	5
80	30	24	12	1
75	81	50	30	1
70	124	72	43	1
65	272	98	52	0
60	78	172	60	0
55	38	30	154	0
50	2	15	23	0
45	1	13	3	0
40	3	7	5	0
35	2	1	3	0
30	2	0	1	0
25	1	1	1	0
20	1	2	1	0
15	1	1	0	0
10	1	0	1	0
5	0	0	0	0
0	0	0	0	0
Totals	675	525	400	55
Median	65	60	55	95

Table for Test IV

Score	7	8	9	Art Teachers
100	83	91	47	38
75	429	301	271	10
50	139	102	71	2
25	24	31	11	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test IV

Score	7	8	9	Art Teachers
100	83	91	47	38
75	489	201	271	10
50	139	102	71	2
25	24	31	11	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test V

Score	7	8	9	Art Teachers
100	54	98	41	34
75	393	277	251	11
50	148	99	79	3
25	65	40	21	2
0	15	11	8	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test V

Score	7	8	9	Art Teachers
100	94	98	41	34
75	393	277	251	11
50	149	99	79	3
25	55	40	21	2
0	15	11	8	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test VI

Score	7	8	9	Art Teachers
100	102	123	99	43
75	394	279	211	6
50	133	96	69	1
25	46	26	21	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test VI

Score	7	8	9	Art Teachers
100	102	123	39	42
75	394	279	211	5
50	173	96	69	1
25	46	26	21	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test VII

Score	7	8	9	Art Teachers
100	98	94	77	39
75	429	276	214	8
50	126	116	100	3
25	22	39	9	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test VIII

Score	7	8	9	Art Teachers
100	104	113	98	42
75	386	280	201	8
50	120	94	69	0
25	40	30	27	0
0	25	8	5	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test VIII

Score	7	8	9	Art Teachers
100	104	113	98	42
75	386	280	201	8
50	120	94	69	0
25	40	30	27	0
0	25	8	5	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test IX

Score	7	8	9	Art Teachers
100	23	28	54	18
75	55	63	196	26
50	391	274	96	5
25	123	103	42	1
0	83	57	12	0
Totals	675	525	400	50
Median	50	50	75	75

Table for Test IX

Score	7	8	9	Art Teachers
100	23	28	54	18
75	35	83	106	26
50	391	274	96	5
25	123	103	42	1
0	84	57	12	0
Totals	675	525	430	50
Median	50	50	75	75

Table for Test X

Score	Gr. 7	8	9	Art Teachers
100	501	433	301	48
90	125	76	79	1
80	41	12	13	1
70	3		2	0
60	1	2	0	0
50	1	0	0	0
40	0	0	1	0
30	0	0	0	0
20	0	1	3	0
10	0	0	1	0
0	2	0	0	0
Totals	675	525	400	50
Median	100	100	100	100

Table for Test X

Score	Gr. 7	8	9	Art Teachers
100	502	435	202	45
90	125	76	72	1
80	41	12	13	1
70	3		2	0
60	1	2	0	0
50	1	0	0	0
40	0	0	1	0
30	0	0	0	0
20	0	1	3	0
10	0	0	1	0
0	2	0	0	0
Totals	672	525	400	50
Median	100	100	100	100

Table for Test XI

Score	Gr.7	8	9	Art Teachers
100	89	101	89	42
75	410	306	211	6
50	126	104	96	2
25	50	14	4	0
Totals	675	525	400	50
Median	75	75	75	100

Table for Test XI

Score	Pr.7	8	9	Art Teachers
100	89	101	89	42
75	410	306	211	6
50	126	104	96	2
25	50	14	4	0
Totals	675	525	400	50
Median	75	75	75	100